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BROOKLYN BOTANIC GARDEN RECORD

EDITED BY

C. STUART GAGER

VOLUME VIII

1919

PUBLISHED QUARTERLY
AT 41 NORTH QUEEN STREET
LANCASTER, PA.

BY THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

PRESS OF
THE NEW ERA PRINTING COMPANY
LANCASTER, PA.

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ERRATA

First page of cover of No. 2 (April), line six, for "1919" read "1918."

Page 95. Add footnote, starred from the title, to read as follows:

* Report prepared from stenographic notes and manuscript of various speakers, by Miss Louisa Bruckman and Dr. C. Stuart Gager.

Page 126. Add signature, C. Stuart Gager, to article ending on this page.

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

RECORD

VOL. IX January, 1920 No. 1

PROSPECTUS OF COURSES OFFERED BY THE BROOKLYN BOTANIC GARDEN, 1920

A. CHILDREN'S GARDENS AND NATURE STUDY

Courses for Children

A1. The Beginners' Garden.—Open annually to 50 boys and girls who have never had instruction in gardening at the Brooklyn Botanic Garden. This course takes up the small garden, what to plant, how to plant it, care, replantings, etc. *Application for plots should be made in person or in writing before March 1st.* Size of plots 8 ft. by 10 ft. All crops belong to the individual. *Fee, twenty-five cents. Saturday* mornings 9–11, *April 3 to October 23.* Miss Shaw.

A2. Second Year Gardens.—Open to boys and girls who have had one or more seasons at the Brooklyn Botanic Garden—a continuation of course A1. Open to 75 boys and girls. Registration should be made before September 1st of each year for the following year. *Fee, twenty-five cents. Saturday* mornings 9–11. *April 3 to October 23.* Miss Shaw.

A3. Advanced Garden Work.—Open to older boys and girls, or to those who have mastered Courses A1 and A2. Size of plot 10 ft. by 20 ft. *Fee, fifty cents.* These gardens are for the raising of vegetables. The work is stated as a problem: "How much can one raise on a plot 10 ft. by 20 ft.?" Hours to be arranged. The student must put in at least two periods a week

during the summer vacation, and if possible, three. Registration date: *April 3.* Miss Shaw.

A4. Preparation for the Outdoor Garden.—The following classes are open to boys and girls during the spring of each year. The courses are planned for a better understanding of plant life and so that the outdoor garden may become a more intelligent piece of work. Classes are limited to fifteen. The *fee* for each course is *fifteen cents* to cover the cost of material.

Boys' Spring Course.—(*a*) *Saturday* mornings 9:15–10, *February 28 to April 17.* (*b*) *Saturday* mornings 10:15–11, *February 28 to April 17.*

Girls' Spring Course.—(*a*) *Saturday* mornings 9:15–10, *February 28 to April 17.* (*b*) *Saturday* mornings 10:15–11, *February 28 to April 17.* Miss Blank, Miss Burtis.

A5. Advanced Work for Older Boys and Girls.—How to raise plants, mix soils, transplant, start seedlings for outdoor gardens, etc. Boys and girls who have taken spring courses under A4 are eligible for advanced work. This work will be of silver pin standard. The *fee* for the course is *twenty cents.* Each student may take home his plants and seedlings. This course is open to both boys and girls over twelve years of age. *Saturday* mornings at 9:15. *February 21 to April 3.* Miss Shaw.

A6. Advanced Nature Work.—A course designed for those older boys and girls who have taken courses A1–A5. Plant collections will be made, and the simpler principles of classification studied. Special problems will be assigned to individuals, and larger garden plots will be set aside for the further working out of these problems. *Open only to pupil assistants of the Garden who are working for their silver pins. Hours to be arranged.* Miss Shaw.

A7. Fall Greenhouse Work.—The following courses are self-explanatory and are for both beginners and advanced students:

Class A.—Open to boys and girls who have been in at least two fall bulb classes before this. This class is for advanced work. The bulbs used will be: Hyacinth, tulip, narcissus, oxalis. Geranium cuttings and primroses will also be used. Time of class, 9:15, *Saturday* mornings. *Fee, twenty-five cents. November 1 to December 20.* Miss Blank.

Class B.—Open to boys and girls who have never taken any greenhouse work before. Bulbs used: Narcissus, oxalis, primrose; also geranium cuttings. *Saturday* mornings at 9:15. *Fee, fifteen cents. November 1 to December 20.*

Miss Blank, Miss Burtis.

Class C.—Open to boys and girls over thirteen years of age. Work is of silver button standard. Subjects studied: Hyacinth, bleeding heart, calla lily, the botany of common cultivated plants, etc. *Fee, twenty-five cents. Saturday* mornings at 9:15. *November 1 to December 20.* Miss Shaw.

Class D.—Subject: basketry. Open to boys and girls 11 years old and over. *Saturday* mornings at 10:15. *Fee, twenty-five cents. November 1 to December 20.* Miss Blank.

Class E.—Open to any boy or girl. Subject: the making of garden Christmas presents. There will be a choice of gifts. Some of the articles made will be the following: a basket, seed packet, flower book-mark, painted pot and plant to go in it, calendar, pot of sweet peas, wooden box, with flower design, one article made in the wood-work shop. *Saturday* mornings at 10:15. *Fee, twenty-five cents. November 1 to December 20.*

Miss Burtis.

A8. Junior Gardeners' Course.—A course for boys 14–17 years of age. Lessons given in the care of border and other flower beds, in the weeding and care of small vegetable gardens, in mowing and watering lawns, repotting plants, etc. This is planned to fit boys for summer work, and to enable them to obtain positions. Hours to be arranged. *Fee, fifty cents.* Practical work with the gardeners and foreman, under the supervision of Miss Shaw.

A9. Nature Study for Boy Scouts, Camp Fire Girls and Others.—Short courses of at least four hours each, with talks, demonstrations, and field trips in the Botanic Garden and Prospect Park to study trees, shrubs, etc. The instruction will be adapted to meet the needs of the various groups who apply. *Open only to groups of at least ten persons.* Hours to be arranged.

Mr. Stoll.

A10. Special Work for High School Pupils.—A course in gar-

spring nature study work and the material used will be the common material one would use in class room work—seed dispersal, evergreens, deciduous trees, etc. Such subjects as Nature's preparation for winter will be covered. Six lessons. *Monday* afternoons at 4, *September 27 to October 25.* Miss Shaw.

B. Courses for Teachers of Children's Gardening

The course for teachers in children's garden work is planned not only to prepare for garden work, but for the teaching of nature study as well. Our courses are so arranged that they emphasize not only the theory of each subject, but its actual practice, either in classroom, greenhouse, garden, or field. At the same time the work is correlated to meet the needs of each grade of the elementary school. There is an increasing demand for good nature study work in our schools, and we make a special point of giving simple, definite, helpful work, grading it so that it applies directly to the immediate needs of our own city schools. Practice is given in all this work with classes of children of different ages. The requirements for entrance are a certificate from a city training or normal school, a college diploma, or several years of certified successful teaching. These courses may be completed during one year, or, as in the case of city school teachers, may extend over a period of two or more years. The *fee for the entire course is twenty-five dollars,* payable in full at the time of registration, or course by course as they are covered. No money will be refunded if the student drops the work, and no monetary allowances will be made for courses taken at other institutions, although time allowances will be made.

Special stress is put upon the outdoor garden practice. This practice is of two kinds: (1) Practice with children. There are three hundred children in our outdoor garden and every opportunity is given for the student to become accustomed to handling children, and for working out problems connected with this phase of work. (2) Practice in the teacher's garden. Each student has a garden of her own and works it herself, thus performing all gardening operations to be taught later to children.

dening or greenhouse work adapted for high school pupils. Classes to be arranged for by the high school teacher.

Note: During the year 1919 classes from Manual Training High School Annex, Erasmus Hall High School, Girls' High School, Brooklyn City Training School, and Bushwick High School were represented in course A10. Miss Shaw.

Saturday Afternoon Lectures for Children and Adults

A series of motion pictures of plant life will be given during the fall and spring of the coming year. Subjects and dates to be announced later.

Courses for Teachers

A21. Greenhouse Work for Teachers.—Do you wish to learn how to raise plants for the school garden or your own garden? This course is a practical one and almost the entire work is done in the greenhouses. All of the seedlings raised belong to the student. *A fee of one dollar* will be charged to cover cost of materials. *Tuesday* afternoons at 4. *February 24 to March 30.* Miss Shaw.

A22. The School Garden.—A series of five practical lessons and demonstrations on the school garden; how to lay it off, plant it, kinds of seeds to use, school garden management, etc. *Fee, fifty cents* to cover cost of materials. *Tuesday* afternoons at 4, *March 30 to April 27.* Miss Shaw.

A23. Spring Nature Study for the Class Room.—This course of four lessons will acquaint the teacher with common nature study material which may be taken into the classroom during the springtime. The work will be based on the syllabus of nature study for the schools of this city, and will be entirely practical. *No fee will be charged* for this course. *Thursday* afternoons at 4 o'clock, beginning *May 6.* Miss Shaw.

A24. Fall Garden Work.—Home plants; the school window box; indoor planting of bulbs; the outdoor bulb bed. A *fee of one dollar* will be charged to cover cost of materials. Five *Tuesday* afternoons at 4, *October 5 to November 2.* Miss Shaw.

A25. Fall Nature Study.—This course is a complement to the

To those who satisfactorily complete this course a certificate will be given. *The courses offered in children's gardening are considered as a unit, and are not given separately.*

Our courses have been accepted by the Board of Education for teachers' credits as follows:

1. Any of the courses will be accepted toward meeting clause "b" of the conditions of eligibility for high school license in Biology.

2. The course in Pedagogy of Botany and Educational Principles of Children's Gardening (**B4**) will be accepted as a satisfactory 30-hour course in Pedagogy toward meeting the requirement of 60 hours' work in Pedagogy in lieu of the written test in Principles and Methods of Teaching for Promotion License.

3. This course will be accepted as a pedagogical course, and either of the other four courses will be accepted as an academic course toward meeting the conditions of exemption from the academic paper in the examination for license as assistant to principal. Such exemption is granted to those who offer 120 hours of satisfactory work, 60 of which must be in the Science of Education and 60 in some branch of literature, science or art, such 120 hours' work not being accomplished wholly within one academic year.

These courses have been accepted by the Brooklyn Teachers' Association and will appear in the new syllabus of courses.

The individual student may apply at any college for credits on these courses, which will be granted according to individual merit.

B1. Botany.—Thirty sessions, *Mondays* at 4, beginning *September 27. Fee $5.* Physiological and morphological principles, general botany, plant families, fungous pests. This course is not only one of theory and principle, but one of practical everyday application. Dr. Olive and Dr. Gundersen.

B2. Nature Study.—Thirty sessions, *Tuesdays* at 4, beginning *September 28. Fee $5.* This course covers the plant material used in nature study teaching. The identification of common trees, shrubs, plants, wild flowers, and weeds. Mounts, charts, and diagrams are made. The student becomes familiar with the actual material. This course is entirely a practical one. The

work is done in field and laboratory. Laboratory and field work has double time, or two hours for a one-hour count.

Dr. Gundersen and Mr. Stoll.

B3. Principles of Agriculture and Horticulture.—Thirty sessions, *Wednesdays* at 4, beginning *September 29. Fee $5.* This course will be specially helpful to teachers. The principles of horticulture are considered and practically applied through greenhouse, laboratory, and lecture work. All laboratory work is given double time. The greenhouse work includes the subject of plant propagation, and the student does his work of investigation with bulbs, roots, rhizomes, seeds, etc. The care of the greenhouse home plants and window box materials is taken up. The subjects of soils, fertilizers, hotbeds, home plants and window box materials is taken up. The subjects of soils, fertilizers, hotbeds, cold frames, tools and implements, and cropping, seed sowing, cultivating, insect and fungous pests, grafting, and pruning are all practically and theoretically covered. Problems of heredity, variation and environment, and their bearing on education, illustrated by demonstration material obtained from plant-breeding experiments and by lantern slides. Lecture subjects: Kinds and extent of variation in plants and animals; how character are inherited; sex in plants and the methods of crossing; human heredity.

Dr. White, Miss Shaw, and Mr. Free.

B4. Pedagogy of Botany and Educational Principles of Children's Gardening and Nature Study.—Thirty sessions, *Thursdays* at 4, beginning *September 30. Fee $5.* Discussion of the mental processes involved in learning and teaching science, and the fundamental principles which underlie and point the way to laboratory and field work. After this a course of study in gardening and nature study based on the school syllabus is worked out and the basic psychological and pedagogical principles discussed. This course includes all the modern phases of the subject and is so arranged that it may be taken directly into classroom work. Gardening as a factor in civic education is a key note.

Dr. Gager and Miss Shaw.

B5. Garden Practice.—Thirty sessions of three hours each, beginning *Saturday, October 2,* at 9 a. m., or hours to be arranged in summer session. *Fee $5.* This course is entirely practical and

includes laboratory and all the outdoor work of the student in his own garden, applying the principles of agriculture and gardening and also work with children in the garden. Three hours count as one credit hour. Ninety hours is the minimum in this course, but students may profitably put in a greater number of hours to the maximum of 630 hours, or seven college credits. Miss Shaw.

C. Courses for the General Public

Courses C1–C13 are *free to members of the Botanic Garden.* They are free to the general public except where otherwise specified. Those planning to take any of this work are asked to register at the Garden at least one week before the course opens, so that adequate arrangements may be made for materials, etc. They are open to both men and women, but no course will be given to a class of less than six.

C1. Plants in the Home. How to Grow Them.—Five talks with demonstrations. Practice in potting, mixing soils, making cuttings, etc. This course deals with the principles to be followed in raising plants. The members of the class have the privilege of keeping the plants raised by them. *A fee of one dollar* will be charged. *Thursday* afternoons at 4 o'clock, *February 5 to March 4.* Mr. Free.

C2. Planning the Garden.—Four lessons. Arrangement of flowers to secure continuous bloom, color schemes, planting of trees, shrubs and plants to best advantage, cropping plans to provide a succession of vegetables throughout the year. *Thursdays* at 4 o'clock, *March 11 to April 1. No fee.* Mr. Free.

C3. The Flower Garden.—Making the most of it. How to improve soils, and get results from planting; old-fashioned flowers; annuals; summer bedding; vines for screening unsightly objects, rose and shrub growing, pruning, making a lawn and keeping it up. Five lectures. *Fee, one dollar. Thursdays* at 4, *April 8 to May 6.* Mr. Free.

C4. Gardening in the Fall.—Six lessons showing how to make cuttings, plant bulbs, care for tender plants, how and what to grow. *Fee, one dollar. Thursday afternoons* from 4 to 5, *September 30 to November 4.* Mr. Free.

C7. Plant Families.—Four lectures on the classification of the higher plants, illustrated by specimens and lantern slides. *Fridays* at 4, *March 4–25.* Dr. Gundersen.

C8. Bacteria and Other Micro-organisms in the Home.—Eight periods devoted to lectures and demonstrations on the occurrence of bacteria, yeasts, molds, and other micro-organisms in the home; in water and sewage; the principles underlying the canning of foods, etc. *Saturdays* at 11, *February 7 to March 27.*

Dr. Olive.

C10. Kitchen Gardening.—Special class will be arranged. A course of five lectures and demonstrations will be given for clubs or groups of individuals having at least 12 persons in each group. Applications for such classes should be sent to Ellen Eddy Shaw, by *February 1.*

C13. Special Lectures on Subjects Related to Gardens.—*Thursdays* at 4, *April 1–29.*

April 1. *Garden Soils.* Professor H. F. Button, State Institute of Applied Agriculture of Long Island.

April 8. *Alpine and Rock Plants.* Mr. Montague Free, Head Gardener, Brooklyn Botanic Garden.

April 15. *Subject and lecturer to be announced.*

April 22. *Wild Flowers Growing Within Motoring Distance of Brooklyn.* Mr. Norman Taylor, Curator of Plants, Brooklyn Botanic Garden.

April 29. *Subject and lecturer to be announced.*

D. Advanced Courses and Investigation

For the following advanced and research courses there is a charge covering all expenses, including laboratory fee, of *$30 for each full course* of 100 credit hours, and *$20 for each half course* of 50 credit hours.

Advanced Courses

D1. Mycology and Plant Pathology.—Morphology and pathology of the fungi and bacteria. Life histories of fungi; methods of control of plant diseases, etc. Prerequisite, a satisfactory college course in general botany. 100 credit hours of work. Hours to be arranged. Dr. Olive and assistant.

D2. Fresh-water Microbiology.—A course of lectures, recitations, and laboratory work on the various organisms found in drinking water. Odors, colors, etc., of drinking water; methods of microscopical and bacteriological examination. 50 credit hours of work. Hours to be arranged. Dr. Olive and assistant.

D3. Cytology.—A course of lectures and laboratory work on cell structure and physiology. Methods of cytological technique, and practice in accurate interpretation of cell phenomena. Prerequisite, satisfactory college courses in general botany and plant physiology. 100 credit hours of work. Hours to be arranged. Dr. Olive and assistant.

D4. Experimental Evolution.—Detailed studies of the nature and causes of variation and heredity. Some of the subjects considered are: Historical Résumé of the Evolution Theory, Physical Basis of Inheritance, Inheritance of Acquired Characters, Kinds and Causes of Variation, Mendelism, Biometry, Principles and Technique of Plant Breeding. This course is open to students of college rank with a knowledge of the elements of physics, chemistry, geology, botany, and zoology. The work is primarily intended for students in pure science, and for agricultural or horticultural students fitting themselves for various professional activities in these particular fields. Three lectures and two laboratory periods a week. 100 credit hours of work. Hours to be arranged. Dr. White.

D5. Phytogeography.—A course dealing with plant distribution over the earth. Prerequisites are courses in plant ecology and geology, and a good general knowledge of climatology and systematic botany. 50 credit hours of work. Hours to be arranged. Mr. Taylor.

D6. Seminar and Journal Club.—Irregular meetings of the Garden Staff and advanced students, for the discussion of fundamental problems of botany or of general biology, and for the review of current botanical literature. Open to others on invitation.

*Graduate Study and Botanical Research**

D7. Research in Plant Physiology.—Independent investigation of problems dealing with plant functions. Dr. Gager.

D8. Research in Mycology and Plant Pathology.—Independent investigation of problems in fungi and fungous diseases of plants. Dr. Olive.

D9. Research in Plant Genetics.—Independent investigation of problems of variation and heredity, including that phase of cytology having a direct bearing on the subject matter of genetics. Dr. White.

COURSE FOR THE TRAINING OF GARDENERS

The following course for the training of gardeners is offered and conducted in coöperation with the Federal Board for Vocational Training.

Requirements:

Age.—At least 18.

Personality.—To be satisfactory to Botanic Garden authorities.

Education.—Schooling through at least the first two years of high school, or its equivalent in experience and general intelligence, to be decided by personal conference.

Enrollment.—Students may, for the present, enter the course at any time.

Continuation.—Students who give evidence that they are not likely to succeed in gardening will not be allowed to continue the course.

Vacations.—Four weeks distributed throughout the year.

First Year

First Quarter

1. Garden and Greenhouse Practice.—Five days a week; hours 9–12; 1–2:30.

* Courses of graduate rank offered by the Botanic Garden, when approved by the Faculty of the Graduate School of New York University, are listed as courses in the Graduate School, and are given the same credit as other graduate courses. Properly qualified students who take these courses may present them in satisfaction of the requirements for advanced degrees given by the University. Graduate credit has also been allowed elsewhere for such advanced work done at the Garden.

Care of tools, care of cold frames, making a hotbed, seed sowing, transplanting, lawn making, hoeing and cultivating, spraying for insect and fungous pests, watering, winter protection of plants, manuring, harvesting and storing, staking and tying supports for climbing plants, spraying, pruning, and repair of trees, propagation by seeds, cuttings, layers, budding and grafting; care of rock garden, perennial garden, bedding plants, aquatic garden, wild garden; making up window boxes and hanging baskets; transplanting trees and shrubs, etc.

Greenhouse.—Watering, ventilating, shading, cleaning plants of insect pests, potting, heating, practice with special crops, orchids (planting and general care); chrysanthemums (potting and general care); ferns, palms, *Primula, Cyclamen,* etc.

2a. Elementary Botany.—Plant structure and function. Twice a week.

3. Soils and Fertilizers.—Once a week.

4. Inspection of the Plantations and Plant Houses Under Guidance.—Study of plant materials. Once a week.

5. Special Lectures and Conferences.—Saturdays.

6. Assigned Readings and Reports.—Once a week.

Second Quarter.

1. Garden and Greenhouse Practice (continued).

2a. Elementary Botany.—Plant structure and function (continued). Once a week.

4. Inspection of the Plantations and Plant Houses Under Guidance (continued).—Once a week.

5. Special Lectures and Conferences.—Saturdays.

6. Assigned Readings and Reports.—Once a week.

7a. Animal Friends and Foes in the Garden.—Once a week.

8a. Fungous Diseases of Plants.—Once a week.

Third Quarter.

1. Garden and Greenhouse Practice (continued).

2b. Elementary Botany.—Classification, identification of plants. Once a week.

4. Inspection of the Plantations and Plant Houses Under Guidance (continued).—Once a week.

5. **Special Lectures and Conferences.**—Saturdays.

6. **Assigned Readings and Reports.**—Once a week.

9. **Principles of Horticulture.**—Once a week.

10. **Trips to Nurseries, Private Places and Other Gardens Under Guidance.**—Once a month.

11. **Plant Relations.**—Once a week for six weeks.

Fourth Quarter.

1. **Garden and Greenhouse Practice** (continued).

2b. **Elementary Botany.**—Classification, identification of plants (continued). Once a week.

4. **Inspection of the Plantations and Plant Houses Under Guidance** (continued).—Once a week.

5. **Special Lectures and Conferences.**—Saturdays.

6. **Assigned Readings and Reports.**—Once a week.

9. **Principles of Horticulture.**—Once a week.

10. **Trips to Nurseries, Private Places and Other Gardens Under Guidance.**—Once a month.

12. **Garden Carpentry.**—Once a week.

Second Year

First Quarter.

1. **Garden and Greenhouse Practice** (continued).

4. **Inspection of the Plantations and Plant Houses Under Guidance** (continued).—Once a month.

5. **Special Lectures and Conferences.**—Saturdays.

6. **Assigned Readings and Reports.**—Once a week.

10. **Trips to Nurseries, Private Places and Other Gardens Under Guidance.**—Once a month.

13. **Garden Planning.**—Once a week.

14. **Floriculture.**—Once a week.

15. **Vegetable Growing.**—Once a week.

16. **Floral Decoration.**—Once a month.

Second Quarter.

1. **Garden and Greenhouse Practice** (continued).

4. **Inspection of the Plantations and Plant Houses Under Guidance** (continued).—Once a month.

5. **Special Lectures and Conferences.**—Saturdays.

6. **Assigned Readings and Reports.**—Once a week.

8b. **Fungous Diseases of Plants.**—Advanced course. Once a week for six weeks.

10. **Trips to Nurseries, Private Places and Other Gardens Under Guidance.**—Once a month.

14. **Floriculture** (continued).—Once a week.

15. **Vegetable Growing** (continued).—Once a week.

16. **Floral Decoration.**—Once a month.

17. **Plant Breeding.**—Once a week for six weeks.

Third Quarter.

1. **Garden and Greenhouse Practice** (continued).

4. **Inspection of the Plantations and Plant Houses Under Guidance** (continued).—Once a month.

5. **Special Lecture and Conferences.**—Saturdays.

6. **Assigned Readings and Reports.**—Once a week.

7b. **Animal Friends and Foes in the Garden.**—Advanced course. Once a week for six weeks.

10. **Trips to Nurseries, Private Places and Other Gardens Under Guidance** (continued).—Once a month.

14. **Floriculture** (continued).—Once a week.

16. **Floral Decoration.**—Once a month.

18. **Types of Gardens.**—Once a week.

19. **Greenhouse Management.**—Once a week for six weeks.

Fourth Quarter.

1. **Garden and Greenhouse Practice** (continued).

4. **Inspection of the Plantations and Plant Houses Under Guidance** (continued).—Once a month.

5. **Special Lectures and Conferences.**—Saturdays.

6. **Assigned Readings and Reports.**—Once a week.

10. **Trips to Nurseries, Private Places and Other Gardens Under Guidance** (continued).—Once a month.

16. **Floral Decoration** (continued).—Once a month.

20. **Window Boxes, Hanging Baskets, Wardian Cases, etc.**—Once a week for six weeks.

21. **Greenhouse Construction.**—Once a week for six weeks.

22. **Plant Forcing.**—Once a week.

23. **Principles of Pruning.**—Once a week for six weeks.

For final certification one year's satisfactory experience will be required, under direction, in an accepted commercial or private garden.

Cooperation with Local Schools

1. **Talks at Schools.**—The principals of public or private schools may arrange to have lantern talks given at the schools on various topics related to nature study, such as garden work with children, tree planting, and Arbor Day. If an illustrated lecture is desired, the lantern and operator must be provided by the school, but slides will be furnished by the Botanic Garden. Address the Curator of Elementary Instruction for list of talks and for appointments.

2. **School Classes at the Garden.**—(*a*) Schools not provided with a stereopticon may arrange for classes, accompanied by their teachers, to come to the Botanic Garden, for lectures either by the teacher, or by a member of the Garden Staff.

(*b*) Notice of such a visit should be sent at least *one week* previous to the date on which a talk is desired. These talks will be illustrated by lantern slides, and by the conservatory collection of useful plants from the tropics and subtropics. Spring and fall announcements of topics will be issued during 1919.

(*c*) The Garden equipment, including greenhouse, plant material, lecture room, lantern, and slides is at the disposal of teachers who desire to instruct their own classes at the Garden. Arrangements must be made in advance with the Curator of Elementary Instruction, so that such work will not conflict with regular classes and lectures.

(*d*) The principal of any secondary or high school in Brooklyn

may arrange also for a series of six lessons on plant culture to be given during the fall or spring to a class. These lessons will be worked out for the most part in the greenhouse. Such a course must be arranged for in advance, and the class must be accompanied by its teacher. Adapted for pupils above the fourth grade.

3. **Home Gardening.**—Assistance will be given to children in planning and planting home gardens. Enrollment cards for such assistance may be had on application to the Curator of Elementary Instruction. Prizes will be offered to both schools and individuals, at the annual Children's Garden Exhibit, for the best results in home gardening. This exhibit is open to all children in the city of Brooklyn, although their garden products may have been raised at their summer homes. *Certifications must be made that the work has been done by the child himself.*

The exhibit for 1920 will be held on *Friday* and *Saturday, September 17* and *18*. All exhibits, of schools as well as of individuals, must be brought to the Brooklyn Botanic Garden before 3 o'clock, *Thursday* afternoon, *September 16*. The exhibit will be judged at 4 o'clock on that afternoon, and will be open for public schools all day Friday, when classes are invited to come with their teachers. The exhibit will be open to the general public on Friday and Saturday from 10 to 4. After 4 o'clock on Saturday afternoon the exhibitors may remove their exhibits. Prizes will be presented on Saturday afternoon, *October 2,* at 2:30 o'clock.

Silver and bronze medals will be awarded as first and second prizes for individual exhibits. A trophy is the first prize for the school making the best exhibit as a whole. A bronze statue is another trophy given for the best school box display. Each trophy is to be competed for annually until one school wins it three times, when it will become the property of that school. A new prize will then be offered.

4. **Penny Packets of Seeds.**—In order to assist the above work, penny packets of seeds are put up by the Botanic Garden, for children's use. In the early spring, lists of these seeds, conditions for entry as an exhibitor, home gardening record cards, and other information may be had on application to the Curator of Elementary Instruction.

5. Conferences.—Conferences may be arranged by teachers and principals for the discussion of problems in connection with gardening and nature-study. Monday and Saturday afternoons are usually available for this purpose. Appointments must be made in advance. Address Miss Ellen Eddy Shaw.

6. Study and Loan Material.—On request, the Garden will endeavor to provide living seedlings or plant parts for study, to the extent of our facilities. Teachers may arrange to have various physiological experiments or demonstrations conducted at the Garden. Petri dishes, which must be cleaned and delivered to the Garden, will, on request, be filled with nutrient agar, ready for exposure in the study of bacteria and molds. In all cases arrangements must be made by teachers for calling for such material, and all material loaned by the Garden must be returned promptly in good condition.

During the fall and spring the Botanic Garden will be able to arrange for a limited number of loan exhibits to public schools of living and herbarium material of spring wild flowers and weeds, and of fall wild flowers and weeds. Applications should be sent in a week before the exhibit is desired to Ellen Eddy Shaw.

Plantations

The plantations comprise several sections, including the local flora (native wild flower garden), general systematic (trees, shrubs and herbaceous plants not native within 100 miles of Brooklyn), morphological, ecological, economic, and rock gardens, Japanese garden, and children's gardens. As noted below, under *Docentry,* arrangements may be made for viewing the plantations under guidance. They are open free to the public daily from 8 a. m. until dark; on Sundays and holidays at 10 a. m.

Conservatories

The Garden conservatories contain a collection of tender and tropical plants. Of special interest for teachers of nature study and geography is the economic house, containing useful plants from the tropics and subtropics, including the following: banana, orange, lemon, lime, citron, kumquat, tangelo (a cross between

the grape-fruit—pomelo—and the tangerine), West Indian cedar (the source of the wood used for cigar boxes), eucalyptus, Manila hemp, sisal, pandanus (source of the fiber used for making certain kinds of fiber hats), fig, grape vines from north and south Africa, date palm, cocoanut palm, chocolate tree, coffee, tea, camphor, ginger, sugar cane, avocado (so-called "alligator pear"), Para and other rubber plants, banyan, religious fig of India, and numerous others.

The conservatories are open daily from 10 a. m. to 4 p. m. In this connection see also below, under *Docentry*.

Herbarium

The Garden herbarium consists at present of over 150,000 specimens, including phanerogams, ferns, mosses, liverworts, lichens, parasitic and other fungi, algæ, and myxomycetes. This collection may be consulted from 9 a. m. until 5 p. m. by those interested, and specimens submitted will be gladly identified.

Library

The rapidly growing library of the Garden comprises at present over 5,000 volumes and over 7,000 pamphlets. This is not a circulating library, but is open free for consultation to all persons, from 9 a. m. until 5 p. m. Over 300 periodical publications devoted to botany and closely related subjects are regularly received.

Docentry

Classes and other parties of several persons, wishing to view the conservatories and plantations under guidance, may arrange with the Curator of Public Instruction for appointments with a docent to conduct them through the Garden. For this service there is charge of 25 cents an hour or fraction thereof, or 10 cents a person for parties of three or more; except that *no charge is made for teachers with classes, nor to members of the Botanic Garden.*

PRESENTATION OF PRIZES

On October 11 the prizes, awarded at the time of the Children's Garden Exhibit, were presented to the winners. The Director of the Garden gave a short address of welcome and immediately presented the individual medals—silver medals for first prizes, and bronze medals for second prizes—to the boys and girls who had won them by the excellence of the crops raised in home and school gardens. Prizes were then awarded to boys and girls of our own children's garden. These prizes consisted of silver and bronze medals and also Thrift and War Stamps. The Thrift Stamps were given for helpfulness in the garden; the War Stamps for carefully kept records of garden work. These prizes, having a total value of $307.06, are the gift of Mr. Alfred T. White to the children of our garden.

Miss Sylvia Wilde, representing the Garden Teachers' Association, presented John Schmacke with a cup. Each year a cup is given by this Association to the boy or girl at the Botanic Garden who has done the best work during the season. This year a special prize was offered by the Flatbush Garden League to the boy or girl in our garden who was here for his first season and had shown the greatest improvement in work. This prize, awarded to Walter Hedberg, of P. S. No. 10, was presented by Miss Edith Hollis, secretary of the League. Each year one of the members of the Teachers' Garden Course is presented with one of the children's silver medals, in recognition of superior work. The recipient this year was Miss Olive Houghton.

The winning schools were then awarded their prizes. In Class C, for the best window box display, P. S. No. 49 received a trophy, a bronze statue of Victory; while P. S. No. 43 received second prize, a silver cup. In Class B, Community Garden Display, McCarren Park and Fort Greene Park Gardens won first prize, a large silver cup. Betsey Head and Highland Park Gardens received the second prize, a smaller silver cup. Class A, the most important class of all in which schools enter, has, as first prize, a bronze plaque which has to be won three times by one school before it becomes the property of the school. For two

years it has been won by P. S. No. 98, but this year P. S. No. 89 carried off the first prize, P. S. No. 98 taking second.

ELLEN EDDY SHAW.

PROSPECTS FOR A NEW NATIONAL BOTANIC GARDEN

At the request of the chairman of the Committee on the Library, House of Representatives, in charge of the so-called botanic garden in Washington, the Commission on Fine Arts has prepared a report on desirable sites for a United States Botanic Garden in the District of Columbia. From this report we learn that the area now occupied by the botanic garden was granted in 1820 to the Columbian Institution for the Promotion of Arts and Sciences, before any attempt had been made to develop the Mall as a park connection between the Capitol and the White House, as was originally intended. It is now the intention to restore this area to the uses first contemplated, and by act of Congress the memorial to Gen. Grant has been located there, thus forcing the garden out. That the Commission fully recognizes the need of a real botanic garden is evident from the following quotations from the Report (*Congressional Record* 58: 4495–4498. Aug. 23, 1919.):

"When comparison is made with the gardens of other cities and countries, the fact is disclosed that the United States Government has no real botanic garden in Washington. The present so-called Botanic Garden does not compare favorably even with gardens established in other cities in this country. The name is a misnomer. A national botanic garden in Washington was conceived in the early days of the century by broad-minded and far-seeing men. It was begun by the employment of Government vessels and a large appropriation for those days. The work was handled by a body of scientists. This garden, so wisely and adequately begun, now serves mainly as a distributor of plants and flowers.

"The present area of the entire establishment devoted to both Botanic Garden display and propagating purposes for congres-

sional use is 12.47 acres. Of this 11.31 acres are included in the fenced area and 1.16 lie south of Maryland Avenue. Of the section lying south of Maryland Avenue a number of stables covering 0.10 acre is used for other purposes and need not be included. Of the area within the inclosure 1.15 acres only are covered by palm houses and other structures, while the remainder of 10.16 acres is used for outdoor display. This latter area has been diminished considerably by the location of the Grant Memorial, and when the construction of the Meade Memorial is begun the available space will be still further decreased.

"The famous Royal Botanic Gardens of Kew, formerly of 253 acres, of which 178 were in the arboretum and 75 in gardens devoted to economic and taxonomic work, had been increased to 288 acres in 1908. The 24 colonial botanical gardens of the British Empire are closely associated and identified with Kew. These associated gardens have opened up new industries in the British colonies, thus creating an increased demand for capital and labor; have introduced quinine, cocoa, and rubber from South American countries to colonies where it was theretofore unknown in culture, and tea into South Africa, where it had not been previously grown: and in many other ways have repaid a thousandfold by vastly increasing the trade of the Empire. This work became so pronounced as to have interested the German Empire to such an extent that Bismarck paid a special visit to Kew to ascertain just what influence this garden was having on the commerce of the British Empire. In this country economic work is done by the Agricultural Department, from whose activities those of a botanic garden should be distinctly separated.

"Berlin has 1,325 acres in its botanic garden, which was established at a cost of $4,000,000. Paris has 75 acres, Edinburgh has 58 acres, Glasgow 40 acres, Petrograd 54 acres, and Rio de Janeiro has 2,000 acres. In the appendix will be found descriptions of botanic gardens in various parts of the world. These gardens are all a source of pleasure as well as of profit to the nations in which they are located. Harvard University has given to the city of Boston the 220 acres comprised in the Arnold Arboretum, the maintenance being retained by the university. St. Louis has 80 acres in its Shaw Gardens. New York has 400

acres. Pittsburgh and some other cities have botanic gardens in connection with their park system.

"The problem is only half solved when provision is made for flowers for Members of Congress and for the present limited output of shrubs and cuttings. There is a demand for a real botanic garden, in which the public may examine living specimens of the enormous varieties of trees, shrubs, vines, and herbaceous plants native to this locality or capable of being grown here, freely, out of doors. These plants should be classified, and the public should be made free of the grounds for recreation and study. The people not only get direct enjoyment, but also they benefit by reason of the help in making selection of trees, shrubs, and other plants for home grounds and for street planting."

After an exhaustive search, including questions of soil, exposure, topography, and transportation, the Commission decided that a tract of land between the Bladensburg Road and the Anacostia River was the most suitable. A report by the Agricultural Department indicated 32 different soils and a large variety of native trees and shrubs. The Geological Survey reported on the geology of the situation and it seemed to be the opinion of the experts in these two Departments that this was an ideal situation. The Government would acquire by the purchase of this tract the second highest elevation in the District, on a car line, two miles from the Capitol Building, and contiguous to the Anacostia Flats Reclamation project, a project authorized by Congress and now in process of development into a land and water park. The 400 acres acquired in the Mount Hamilton tract, added to that available in the Anacostia movement, would make a Botanic Garden, including land and water areas, of about 1,600 acres, with elevation from water level to 260 feet, and with a frontage on the Anacostia River of about 9,000 feet.

The tract is on the main highway between Baltimore and Washington, and with little difficulty, the Lincoln Highway could be brought along the shores of the Anacostia Park and thence by way of Maryland Avenue to the Capitol building, affording an entrance to Washington, as the report states, of unequalled beauty.

C. S. G.

NOTES.

Annual Party of the Boys' and Girls' Clubs.—The children's annual ice-cream party, the winding-up event of the children's outdoor garden at the Botanic Garden, was given on Saturday, October 18. About 350 children assembled in the auditorium of our building at 10 o'clock in the morning. The meeting was called to order by Lillian Baker, Vice-president of the Boys' and Girls' Clubs, acting in place of the President, who was absent. The chairman spoke a few words of welcome to the boys and girls, and also to the Director, Dr. Gager, and to Mr. Alfred T. White, the guest of the morning. Different boys and girls were called upon to describe to Mr. White the various phases of our work carried on here. Fifteen boys and girls received silver pins. Winning a pin is an important event, because the silver pin stands for a year of work upon some special subject. Subjects covered this year were soils, seed testing, indoor plant culture, and the outdoor garden. One of the boys presented Mr. White with thirty-five dollars for the support of our little French orphan. The money is placed by the American Ouvroir Fund. Another boy presented the Director with twenty-five dollars to be used to purchase whatever he chose for his personal office at the Botanic Garden building. Three friends, Mrs. Elizabeth Steeves, Mrs. Maria Magnusson, and Mr. Alfred DeLand, were each presented with one of the children's silver medals. This was a token of appreciation from the boys and girls for all the work these grown people have done for them—work unsolicited and most helpful. At the close of the meeting Private Maurice Campbell, the only member of this club who went to war, presented Mr. Alfred T. White with a German officer's helmet. At the end of the meeting ice cream and cake were served—a glorious wind-up to our garden season.

Awbury Arboretum.—The *Bulletin* of the Geographical Society of Philadelphia for July, 1919, contains an account of a visit of the Society to the Awbury Arboretum on last June 7. This arboretum, comprising over 30 acres at Washington Lane Station, near Philadelphia, together with a generous endowment, was pre-

sented to the City Parks Association by Miss Caroline E. Cope and other members of the Cope family to be maintained as an arboretum and refuge for migratory birds. As stated in the *Bulletin*, the upland area is already very well and beautifully developed in the English style. The trees and shrubs are to be grouped by families, and the planting has already begun. From the address delivered at the June meeting by Professor Arthur W. Cowell, of Pennsylvania State College, landscape gardener of the Arboretum, we learn that a rose garden is planned "to contain, we hope, every variety of garden rose known." The same address also states that "the system of naming is that which will be found of greatest advantage to average people and students and nurserymen, and the names adopted by the Committee upon Standardized Plant Names have been used. These are the terms found in most botanies and in the Cyclopedia of Horticulture."

On November 14, 1910, the Garden received as a gift from Mr. R. G. Eccles, M.D., 1,660 mounted herbarium specimens representing especially the flora of Long Island and other parts of the United States.

The Garden library has received the initial number of two new botanical publications. In July appeared the first number of the *Journal of the Arnold Arboretum*, under the editorship of Prof. Charles Sprague Sargent, director of the Arboretum. This periodical will appear quarterly, and the editorial announcement states that "in its pages will appear notes on trees and shrubs with descriptions of new species and their relationships, letters from correspondents, and notes on vegetation of countries visited by officials and agents of the Arboretum. In the *Journal* of the Arboretum will also appear such items of news about the Arboretum, its library, collections and projects which will interest botanists, horticulturists and their friends of the institution." It is further stated that the new *Journal* will not take the place of the Bulletins of Popular Information published at irregular intervals by the Arboretum.

In September, 1910, appeared the first number of the *Journal of Indian Botany* edited by P. F. Fyson, B.A., F.L.S., Presidency

College, Madras. As stated in the prefatory editorial "the *Journal of Indian Botany* has been started to provide means of publishing botanical work done in India which would not naturally find a home in the existing botanical journals of this country, *e.g.*, the Records of the Botanical Survey and the various publications of the Agricultural Departments." It is stated that the need for such a journal has long been felt and that the venture owes its inception to the enthusiasm of Mr. L. J. Sedgwick, F.L.S., a worker in systematic botany, and to Mr. T. R. D. Bell, C.I.E., who has offered to guarantee the expenses till the journal should be so far established as to pay its way or prove unwanted. The chief object of the journal will be the publication of original matter, but in addition it is announced that abstracts and reviews will be published of papers which appear in other journals.

Mr. Alfred H. Cockayne, head of the biological division of the New Zealand Dept. of Agriculture, and Mrs. Cockayne were callers at the Botanic Garden on October 29. Mr. Cockayne is visiting the leading botanical laboratories in the United States in connection with an important mission for the Government of the New Zealand Dominion.

Callers at the Botanic Garden from out of town during October included Mr. Alexander MacElwee of the Fairmount Park Commission, Philadelphia, and president of the Philadelphia Botanical Club, and Dr. Reginald H. Colley, pathologist in the Office of Forest Pathology, U. S. Dept. of Agriculture.

On Friday afternoon, October 24, the Flatbush Garden League entertained representatives from a number of out-of-town garden clubs at the Brooklyn Botanic Garden. Following an address of welcome by the director of the Garden, Dr. Gundersen of the Garden staff gave an illustrated talk on Fall Wild Flowers. Reports were also given by representatives of the various clubs. Tea was served in the exhibit room.

The Inkowa Club, of young women, visited the Garden on Sunday, November 16, inspecting the conservatories and plantations. The curator of public instruction acted as guide.

On November 19, at one of its regular Wednesday afternoon teas, Miss Ellen Eddy Shaw, curator of elementary instruction, Brooklyn Botanic Garden, spoke to the library school of the New York Public Library on the work of her department. The audience consisted of library school students, alumnae, members of the New York Public Library Staff, and visitors.

About 25 students of the library school of the New York Public Library visited the Garden library on October 3, 1919, accompanied by Miss Edith W. Tiemann, registrar of the school. The librarian gave an informal talk on the methods used in the organization of the library, and answered a number of questions regarding the work of the library brought forth by the inspection of various files and catalogues. Tea was served in the exhibit room, after which the class was shown through the economic house and then taken for a tour of the grounds by Dr. Olive and Dr. Gundersen.

Awarding of Certificates.—On Saturday afternoon, December 13, 1919, certificates in children's gardening were awarded to the eight young women who completed the year's course of instruction during 1919, as follows: Jean Caldwell, Eva Dudman, Olive Houghton, Anna Remmert, Ethel A. Weeks, Hannah M. Sweeton, L. Adele Richards, Mrs. Anna Everson Bailey. The address was by Mr. Ray P. Snyder, supervisor of junior project work, of the New York State Department of Education, Albany, on "The School Garden as a Means of Education." Following the exercises in the auditorium, tea was served in the main rotunda of the laboratory building. Following the custom of former years the graduating class of the preceding year presented a gift to the Botanic Garden. The gift this year was a brass samover. The present year's class also presented a cement shaft for the sun dial which was given in 1914 by the class of that year. The shaft, a small model of which was exhibited, was designed by Miss Isabelle M. Kimball.

The Garden library has received volume one, number one (October, 1919) of the *Boletin del Laboratorio Municipal de Guaya-*

quil. This new publication, to be issued quarterly, is under the editorship of Dr. C. D. Andrade, and is published by the Municipal Press of Guayaquil.

Mr. M. B. Waite, pathologist in charge, office of fruit disease investigations, and Mr. O. F. Burger, pathologist in the same office, called at the Garden on December 16.

FIG. 1. Brooklyn Botanic Garden. General view, looking south from the roof of the Brooklyn Museum.

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

RECORD

VOL. IX April, 1920 No. 2

NINTH ANNUAL REPORT OF THE BROOKLYN BOTANIC GARDEN, 1919

REPORT OF THE DIRECTOR

TO THE GOVERNING COMMITTEE OF THE BOTANIC GARDEN:

Gentlemen: I have the honor to present herewith the ninth annual report of the Brooklyn Botanic Garden, of the Brooklyn Institute of Arts and Sceinces, for the year 1919.

Public Instruction

Cooperation with the Federal Board for Vocational Education.—Last spring the facilities of the Garden were offered to the Division of Rehabilitation for Disabled Soldiers, Sailors, and Marines of the Federal Board for Vocational Education. The Federal Board was especially glad of an opportunity to place men in training for gardening on Long Island as many men seeking such an opportunity resided on the Island, or at such other points as made Brooklyn most readily accessible. A course of study was outlined, requiring two years to complete. This has been published in the annual *Prospectus* for 1920. It includes both theoretical and practical work in conservatories and plantations. Final certification of competence as a gardener is to be granted (on completion of the course) only after one year's satisfactory experience, under direction, in an accepted commer-

cial place or private garden or estate. By the terms of the co-operative agreement the Federal Government pays the tuition of the men in training, and meets all necessary expense of equipment, in addition to paying the men a monthly allowance. The first student in this course registered on July 21.

School Classes at the Garden.—One of the most gratifying features of the educational work of the year has been the very large increase in the response of the schools to the advantages for cooperation afforded by the Garden. A total of 167 classes accompanied by their teachers have visited the Garden, as against 82 in 1918; the number of pupils in these classes was over 15,400 as compared with a little less than 4,400 the preceding year. But, as the curator of elementary instruction points out in her report appended hereto, many if not most of these classes, are given three periods of work at each visit, occupying an entire half day. In order to compare these attendance figures, therefore, with those representing merely attendance at a lecture of one hour's duration, which is the form museum and botanic garden cooperation with public schools most commonly takes, these attendance figures should be multiplied by three, which would give an attendance figure of over 46,000. This figure would be a truer index of the response of the schools and of the demands made upon the Botanic Garden.

Even more gratifying than the increase in the numbers of pupils and classes, is the fact that a larger number of schools are using the Garden. As noted in the curator's report, while only three schools, or less than one per cent., made any use of the Garden in 1913 when the work was started, last year 112 (or over 62 per cent.) of the public elementary schools, 11 high schools, and 9 parochial schools have been served in one way or another, and 30 per cent. of the elementary schools have sent classes here for instruction. For the first time since the Garden was established, classes have come to us from the boroughs of Manhattan and the Bronx.

The advantages offered at the Garden include practical work in the children's greenhouse in plant propagation, and other subjects, laboratory and field study in the plantations and conservatories, and a certain amount of public lectures to larger groups.

But the most satisfactory and most valuable results are obtained by working with small groups. The author of *The Education of Henry Adams* describes "the lecture system to classes of hundreds" as "very much that of the Twelfth Century," and gives

Fig. 2. Ex-soldiers in the two years' training course for gardeners. An outdoors lesson.

his opinion that "no man can instruct more than half-a-dozen students at once." This is perhaps a somewhat extreme statement, but it is generally agreed among educators that the largest class that can be handled by one teacher to best advantage is about twenty. If we had not adhered as rigidly as possible to

this plan of working with small groups it would have been comparatively easy to more than double our figures of attendance.

Need of Motor Bus.—To take a class of from 30 to 50 children, of ten to fifteen years of age, from almost any public school in the City to the Botanic Garden requires a trolley ride, and often a transfer from one line to another. Under ideal conditions of transit this would involve more or less danger to the children, and place a large responsibility upon the teacher. Under the present overcrowded condition of all transit lines, at practically all hours of the day, the danger and risk are greatly increased. Teachers who bring classes carry a large responsibility and are entitled to much credit for making the effort. Of course if teachers and principals did not feel that the educational returns of a visit to the Botanic Garden were large enough to justify the effort and risk of the trips they would not be made in such large numbers throughout the year.

A large motor carry-all is greatly needed to transport the children to and from the Garden; this would make it possible for the children to come with less risk of accident, with more comfort (regardless of the weather), with less loss of time in transit, and therefore more frequently, and with closer adherence to schedule. The city of Cincinnati pays the carfare of the children to and from their children's gardens, under certain regulations, but the better plan is the motor bus, as here suggested. No finer philanthropic opportunity is now at hand in Brooklyn for one who loves children and believes in making their educational advantages as rich as possible.

Cooperation with High Schools.—In the *Bulletin of High Points* for November, 1919, published by the New York City Board of Education, there is an article by Dr. R. C. Benedict, of Stuyvesant High School, on the cooperation of the Garden with High School work in botany. Dr. Benedict, formerly on the staff of the Bushwick High School, Brooklyn, has made large use of the Garden to supplement the regular work of the high-school classes in botany, and in his article speaks with warm appreciation of the advantages available at the Garden.

The appended report of the curator of public instruction notes that nearly one thousand petri dishes and test tubes filled with

sterilized nutrient media have been supplied to twelve high schools in Brooklyn, Manhattan, and the Bronx for use in connection with their studies of bacteria and the molds. It should be noted here that this important part of the biology work of the high schools would be practically impossible except for such cooperation as we have been able to give.

FIG. 3. Ex-soldiers in the two years' training course for gardeners. Conservatory exercise.

Educational Conference.—The Botanic Garden RECORD for July, 1919, contained a full account of the Educational Conference on Biology in New York City High Schools, held under the auspices of the Garden in the auditorium on Friday evening, April 4. The purpose of the meeting was to secure an expression of opinion, primarily from administrative officials of New York City high schools, as to the actual and possible value of ele-

mentary biology as a high-school subject. The proposed introduction of courses in general science and community civics in the first year of New York Cty high schools created the possibility of the elimination or serious curtailment of biology. It was the unanimous opinion of every speaker that biology, both in content and in educational discipline, contributes something essential in the preparation of young men and young women for citizenship and which is not afforded by any other subject and it was the expressed opinion of all of the principals that the elimination or curtailment of general biology from the high school course of study would be an educational mistake. All of the speakers emphasized the necessity of planning the content of the course so as to make a very intimate and obvious co-relation with the everyday life of the individual.

The conference is considered by many as the most important meeting for the consideration of this question that has ever been held in New York City, and the result was especially significant in view of a commonly expressed opinion—shown by this conference to be wholly erroneous—that many if not all of the high school principals were opposed to the subject of elementary biology. The conference was well attended, and the calling of it was greatly appreciated by teachers of biology and others.

Children's Gardens.—During the year 320 boys and girls were registered for plots in the children's garden. They came from 45 Brooklyn schools, including 25 public elementary schools, 9 public high schools, 9 parochial schools, one private school, and one training school. The average value of the crop produced by an $8' \times 10'$ plot was $16.89; from a $10' \times 20'$ plot, $34.46. The total value of the produce taken from the gardens during the season was $3,914.24. Fees paid by the children amounted to $75.45, making a total income of $3,989.69. The total cost to maintain these gardens, including salaries, was $1,839.33. Keeping in mind the fact that the primary purpose of the children's garden is educational and not commercial, it will be recognized at once that the total returns on the investment, in the form of health, happiness, education, character, and good citizenship for 320 boys and girls, plus nearly $4,000 worth of wholesome food, stamp the children's garden as a most efficient and successful

undertaking, and a factor of the highest importance in the educational activities of the city.

Sixth Annual Children's Garden Exhibit.—The Sixth Annual Children's Garden Exhibit was held this year on Saturday and Sunday, October 4–5. This is the first exhibit to be held in the rotunda of the laboratory building, and the first year the exhibit has been open to public view on a Sunday. Both experiments were successful. The exhibit has steadily improved from year to year, and this year was no exception. The judges were Mr. A. L. Miller, President of the Society of American Florists and Ornamental Horticulturists, Mrs. Katharine Paul, Executive Secretary of the National Plant, Flower and Fruit Guild, and Mr. Free, Head Gardener of the Botanic Garden.

A full account of the annual presentation of prizes, on October 11, will appear in the RECORD for January, 1920. The prizes consisted of two trophies, silver and bronze cups and medals, and thrift and war saving stamps, having a total face value of $307.06; also certificates of honorable mention.

Graduation of Garden Teachers.—On Saturday, December 13, occurred the sixth annual graduating exercises of those who had completed our year's course for the preparation of teachers of children's gardening. The address was given by Mr. Roy P. Snyder, in charge of Junior Project Work, New York State Department of Education, Albany, on the subject, "The school garden as a means of education." Following a delightful custom initiated by the first class (1914), the graduating class presented a gift to the Botainc Garden—this year a cement shaft for the sun dial which was given by the class of 1914. A brass samovar was presented by the outgoing class.

Board of Education Credit.—The New York City Board of Education has accepted our courses for the preparation of teachers of children's gardening for credit toward meeting certain conditions of eligibility for a high school license in biology, and for promotion and exemption. A full statement is given in the *Prospectus* for 1920.

Public Lectures.—A course of illustrated spring lectures, free to the public, was given on Thursday afternoons in March on the general subject of gardens and gardening. Each lecture was by a different speaker, not a member of the Garden staff.

FIG. 4. An audience of children coming from an exhibition of motion pictures of plant life.

Nine illustrated lectures were also given by the head gardener, Mr. Free, on the subject, *"How to make your garden grow."* These lectures were also free to the public, and were given on Monday afternoons from March 3 to April 7, and on Wednesday evenings from March 5 to March 19.

Educational "Movies."—On May 27 and 28, and on June 2, motion pictures of plant life were given in the auditorium. The room seats 577. The attendance was 650 on the first day, 590 on the second, and 372 on the third. The attendance dropped on June 2 because of the inter-scholastic athletic meets and field days. The attendance might have been increased indefinitely if we had an instructor to do nothing else, and if we had not limited attendance to pupils who were invited on the basis of excellence in the regular school work.

Earlier in the year (March 25), under the joint auspices of the Torrey Botanical Club and the Botanic Garden, an exhibition was given of four motion picture reels of plant life, including one showing the penetration of the tissue of a potato tuber by the filament of the parasitic fungus that causes the disease known as "potato leak."

Meetings of the Garden.—The following six organizations held regular monthly, bi-monthly, or weekly meetings at the Garden during the spring, summer, and fall:

1. Erasmus Hall Students' Garden Club, meeting twice monthly.
2. Garden Club, Manual Training H. S. Annex, meeting twice monthly.
3. Group from Bushwick H. S., meeting once weekly for 5 weeks.
4. Backyard Garden Class, Erasmus Hall H. S., meeting once weekly for 5 weeks.
5. Platbush Garden League, meeting once a month. An adult club for the discussion of garden problems.
6. Nature Study Club, City Training School, meeting once a week for six weeks.

The first five of these organizations were started largely through the influence of the Botanic Garden.

The School Garden Association of New York held its annual meeting and garden party at the Botanic Garden on the afternoon

of June 7. Brief addresses were made by Dr. Gustave Straubenmüller, associate city superintendent of schools of New York City, and president of the association, by the director of the Garden, and by Mr. Charles Lathrop Pack, President of the National War Garden Commission. A special exhibit of books on gardening was prepared by the Librarian, the exhibit of paintings of California wild flowers was open to view, and tea was served by the department of public instruction. After the tea, the members and guests made an inspection of the plantations under guidance of members of staff.

A full list of meetings of outside organizations held at the Garden during the year is given on page 000.

Extra Mural Activities.—The outside demands on the Botanic Garden for botanical information, gardening advice, inspection of plants, lawns, soil, and gardens, and for lectures and addresses steadily increases, and has reached our full capacity to respond. The outside addresses during April and May averaged one for every two days. The attendance at these addresses and talks has totaled over 17,600 for the year.

Conservatories Reopened.—Owing to the coal shortage during the winter of 1917–18, and the injury to our conservatory plants resulting therefrom, it was not found feasible to open the conservatories to the public during 1918. The plants having recovered in a measure, and a sufficient supply of coal being assured, the conservatories were reopened to the public on Sunday, February 9.

Investigations

Cooperation with the Federal Government.—Dr. F. C. Meier, and Mr. E. D. Eddy, of the Bureau of Markets, U. S. Department of Agriculture, have continued in the Garden laboratories their study of the diseases of transit and storage of fruits and vegetables in the markets of Greater New York. The Botanic Garden has profited in many ways by having this work centered at our laboratories. Dr. E. W. Olive and Dr. O. E. White have both spent a portion of their vacation this sumer in plant disease survey work for the Federal Government. Dr. Olive's work being on the potato wart disease, and Dr. White's on the rust disease of cereals and grasses.

Plant Breeding.—Investigations of the laws of heredity and variation in plants have been carried on as heretofore by the curator of plant breeding, with the part-time assistance of Mrs. Margaret Burdick and Mrs. Alma H. Raymond. This work is still much hampered by lack of adequate trained assistance, and by the dearth of such facilities as a calculating machine and sufficient greenhouse space.

During September, October, and most of November, the curator of plant breeding was on leave of absence, investigating grasses and grass diseases for the Office of Cereal Investigations, U. S. Department of Agriculture. This work involved collecting and investigations in various parts of Maine, Connecticut, Massachusetts, Vermont, New York, New Jersey, Virginia, and North Carolina.

Plant Diseases and Mycology.—Dr. Olive's report records his work, during his summer vacation in September, with the Plant Disease Survey Office of the U. S. Department of Agriculture, investigating the serious "potato wart" disease in Connecticut, and also his field work near Ithaca, N. Y., June 1–6; on Long Island, June 24–28; and again in Connecticut, August 18–22. The fungus collections of the Garden were increased and enriched as a result of this work.

Systematic and Ecological Work.—The curator of plants, Mr. Taylor, was one of a party that initiated an ecological survey of the region near the timber line on Mt. Marcy, May 31–June 8, under the auspices of the Ecological Society of America. The results of these investigations, involving quantitative instrumental measurements of climatic and other environmental factors, should throw considerable light on the question of the causes of a timber line, and should also yield information of practical value in connection with the problem of reforestation of high altitudes. Mr. Taylor also continued his studies of the flora and vegetation of Long Island.

Collections of living plants made by the head gardener, Mr. Free, on Mt. Marcy during the fore part of October included the Lapland Rhododendron, dwarf specimens of willow from near the timber line, dwarf birch (*Betula glandulosa*), Labrador tea (*Sedum groenlandicum*), Greenland sandwort (*Arenaria groen-*

FIG. 5. An orchid (*Angraecum superbum*) in bloom in the orchid house.

landicum), *Diapensia lapponica,* and others. These plants have been added to the rock garden.

Collections of seeds and living plants were also made by the assistant curator of the herbarium in the Catskill Mts., and by the director on the coast of Maine.

Herbarium

Accessions.—Accessions to the phanerogamic herbarium numbered 11,717 as against 2,311 in 1918; and to the cryptogamic harbarium 9,676 as against 1,900 the year before, a grand total of 21,393, specimens. The curator of plants notes especially the acquisition by purchase of the private herbarium of woody plants, 6,000 specimens, collected at the Arnold Arboretum by Mr. Camillio Snyder, of Vienna, and by gift the herbarium of Miss Fanny A. Mulford, of about 4,000 specimens from Lnog Island and vicinity.

Conservatories

The construction of the concrete lily pools and the paths for the Conservatory Garden necessitated the closing of the plant houses from June to November.

Library

Accessions.—Among the most important accessions to the library was a complete set of the original edition of Saccardo's *Sylloge Fungorum.* Other important accessions are noted in the appended report of the librarian. A total of 462 volumes and 974 pamphlets was added during the year, and 46 new periodicals were added to the current periodical file, making a total of 389 serials currently received.

Spring Inspection

The seventh annual spring inspection of the Garden, by trustees, members, and invited guests, was held on Tuesday afternoon, May 13. This date proved to have been the only pleasant day for a week or more preceding and following. The special feature was an exhibition of paintings of California wild flowers

FIG. 6. Japanese Garden. The new fence. View facing east from the moon viewing house.

by Miss Ida A. Johnson and Miss J. M. Culbertson. Tea was served by the Woman's Auxilary.

Plantations and Grounds

In addition to the routine operations of maintenance, several large projects of development were completed or initiated. Besides those listed in the appended report of the curator of plants, there should be mentioned the construction of the concrete lily pools and the stone seats and curbs of the Conservatory Garden, designed by Mr. Caparn, the consulting landscape architect. This garden, the need of which was noted in my preceding annual report, is a gift to the Botanic Garden from three friends, and the work was done by John Thatcher and Son, under contract with the donors. On account of the abnormal labor condition and also of the excessive number of wet days, it was not possible to complete the work before winter weather set in.

A fence, of Japanese type, was constructed along the east border of the Japanese Garden by Japanese carpenters working under the direction of Miss Averill, honorary curator of Japanese gardening and floral art. This fence, an attractive feature in itself, will serve to shut out the annoying sights and dust of Washington Ave., and thus give greater privacy to the Japanese Garden. Many new evergreens were also planted in the garden.

About one acre of new lawn was added in September east of the brook on the south addition, and on the Washington Ave. side of the laboratory building.

Among the new plantings, listed in the appended report of the curator, the row of Lombardy poplars along the east and south edge of the grounds will serve ultimately to exclude, in large part, the most unsightly view outside of the Garden.

Maintenance.—Out-of-doors operations began on March 10, the earliest date in the history of the Garden. The laboring force varied in number from 32 in May to four near the close of the season, the total number of men-days being 4,713, as against 3,030 in 1918, and 2,956 in 1917. The following precipitation data are of interest as affecting our work so greatly:

Precipitation Data, June–September, 1919

	1919	Average	Greatest	Least
No. of rainy days	54	41	70	13
Precipitation in inches	21.50	15.92		

On account of the excessive precipitation a great deal of extra labor and expense was entailed in keeping the lawns mowed. Recalling that to mow the Garden lawns it takes an average of six men daily during the summer months, at a cost of about $100 a week, it is evident what a drain this one item has been on labor and finances. But the grass has seldom before kept so green throughout the season.

The extension of the Iris planting, additions to the rock garden, and other new planting are recorded by the curator of plants.

Labeling.—The educational value of the plantations depends largely upon their being suitably labeled, and the label problem has been one of the most difficult ones that botanic gardens have had to solve. A satisfactory label must be easily legible, large enough to carry necessary information but not so large as to detract from the appearance of the grounds by being too conspicuous, high enough above ground to avoid being splashed with mud when it rains, placed so as not to be concealed by the foliage, firm enough to not be easily disturbed by the cultivating operations of the gardener, attractive in color scheme, pleasing in proportion and design, easily stored when not in use, not too expensive to construct and maintain, and above all sufficiently durable to resist the weather and especially as effectively as possible the depredations of small boys and vandals. The assistant curator, Dr. Gundersen, has given a great deal of careful attention to this problem and appears to have reached a satisfactory solution of the problem. The new label is of metal throughout, consisting of a steel upright which supports four steel plates which carry the reading matter for four different plants, two on each side, raised about one foot above ground. Bed labels are provided by larger plates bearing the names of the plant families and borne above the individual plant labels on the same upright (Fig. 7). The upright extends 18 inches into the ground, and is bent at

right angles three inches above the lower end. It is practically impossible to pull the label up, or to injure the label-plates except with more care and deliberate intention than is usually expended in such matters.

FIG. 7. The new all metal label, showing bed label for the family and four species labels for individual plants on one upright.

In connection with the new type of label Dr. Gundersen has worked out a new system of accessioning and record, one feature

of which provides for a map of the plantations, and a diagram showing the contents of each individual bed. These records make it possible to dispense almost entirely with thousands of the zinc service labels formerly used, thereby saving considerable expense, and avoiding endless annoyance through the loss of the labels and, consequently, the records which they carried.

Statistics.—A total of 756 living plants were added to the collections as against 658 the year preceding; five living plants and 1,633 packets of seed were sent in exchange, and 580 packets were received from botanic gardens.

Publications

American Journal of Botany.—Volume VI of the *Journal* (1919) comprised 455 pages, with 41 plates and 96 text figures. This is one hundred pages less than were published in 1918, but the size of the printed page was larger ($7\text{–}7/16'' \times 4\text{–}10/16''$ as against $6\text{–}13/16'' \times 4\text{–}5/16''$), so that the total amount of printed matter was slightly in excess of that for 1918.

Record.—Volume 8 of the administrative quarterly, the *Record,* comprised 157 pages and 10 illustrations, as against 128 pages and 8 illustrations in 1918. For the first time the April number containing the *Annual Report*, was issued with a special cover.

Contributions.—One number of the *Contributions* (No. 22) was issued.

Prospectus.—The *Prospectus* for 1920 was issued in January, 1919, as a reprint in advance from the *Record* for January, 1920, following the plan adopted last year. A new feature of our educational work is the two-year Course for the Training of Gardeners, announced for the first time in the *Prospectus.*

Miscellaneous.—A total of 39 publications by members of staff, including books, articles, addresses, reports, and reviews, appeared during 1919, as against 49 in 1918. A list of titles is given in Appendix 2 (p. 00). In addition a large number of abstracts of current botanical literature were prepared by various members of staff for *Botanical Abstracts.*

Seed List.—A complete new edition of the *Seed List* was not published, but the List of 1918 was re-distributed, accompanied

by a supplemental list (8 pages) of the 1919 collections, containing 281 additional species and varieties.

Financial Matters

City Appropriation for Maintenance.—The most difficult financial situation in the history of the Garden was caused by a reduction of $5,229 in the city appropriation for maintenance—the amount for 1919 being $48,000 as against $53,229 for 1918. The appropriation was less than the request by $21,739. Two alternatives confronted us: either to allow members of the scientific and educational staff and other employees to resign, or to divert meager unrestricted private funds from the educational and scientific purposes for which they were intended, and endeavor to secure special contributions for the necessary balance required to enable us to prevent the grounds, buildings and collections from deteriorating, and valued employees and members of staff from resigning.

The situation was regarded as, in large measure, an expression of the abnormal financial condition prevailing generally throughout the world, and every effort was made to secure by special subscription sufficient private funds to supplement the city appropriation so that we need not go backward, even though we could not make progress. This required the collection of nearly $28,000 of private funds to meet necessary maintenance charges in excess of the city appropriation.

Permanent Improvements.—Small unexpended balances ($205.33) remain on Corporate stock and Suspense Accounts. On July 18 an issue of $5,000 of Tax Notes of the City of New York was authorized for the extension of the underground coal cellar from the fence line to the street curb. Plans and specifications are being prepared for advertising for bids early in 1920.

Resignations

Mrs. Jean Cross Weis, assistant curator of elementary instruction presented her resignation on July 13. Mrs. Weis (then Miss Cross) was granted leave of absence in December, 1918, for reconstruction service in France with the Wellesley Unit,

under the auspices of the Y. M. C. A. Her resignation was accepted with regret to take effect on January 1, 1920, and her leave of absence without pay was extended to that date.

New Positions and Appointments

Honorary Curator of Japanese Gardening and Floral Art.—The creation and filling of this position, recommended in my preceding annual report, was authorized by the Governing Committee in January. The Garden has been fortunate in securing for this curatorship Miss Mary Averill, one of the foremost of American authorities on Japanese gardening and floral art, and widely known as a lecturer, and the author of numerous articles and books on that subject.

Instructor in Children's Gardening.—The vacancy in the assistant curatorship of elementary instruction, and the growth of the work necessitated the assistance of two instructors. We have been fortunate in being able to secure for these positions two of the graduates from our teachers' training course. Miss Eugenie Blank, who was appointed in 1918, and Miss Edna Burtis, appointed on March 1, 1919.

Secretary and Accountant.—In the Botanic Garden Record for July, 1919, there was recorded the sad death, on June 4, of Miss Bertha M. Eves, secretary and librarian from January 1, 1911, to September 1, 1913, and secretary and accountant from the latter date until her death. Miss Philura Brower was acting secretary and accountant from June 2 until August 1, when her permanent appointment took effect. On August 1 Miss Mabel Harris was appointed assistant secretary.

Assistantships.—Two assistantships were filled during the year: library assistant and laboratory assistant.

Recommendations

Curator of the Herbarium.—The rapid growth of the phanerogamic herbarium, averaging over 10,000 specimens a year since the Garden was established, and the scientific and educational needs connected therewith, makes necessary the appointment of a curator who may devote all of his time to that work. The proper

physical care of such a collection needs constant supervision; requests from the public for the identification of specimens and the use of the collections by the public are constantly increasing. At present the herbarium is in charge of the curator of plants and assistant curator whose duties in connection with the plantations and conservatories demand such a large proportion of their time that the needs of the herbarium cannot be adequately met, and little time or energy is left for investigation. I urge the appointment of a curator of the phanerogamic herbarium as soon as funds can be secured, and during 1920 if possible.

Curator of Plant Pathology.—A collection of several thousand species, and many more individuals, of living plants, woody and herbaceous, in conservatories and garden, all more or less subject to disease, and requiring to be kept in prime condition for purposes of public exhibition, necessitates the constant attention of a competent plant pathologist. Unsolved scientific problems are constantly emerging in this connection. The disastrous loss from diseases of the white birches in the Garden during the past two or three years, and the earlier loss of practically every chestnut tree from Prospect Park and other city parks due to the chestnut bark canker, are striking illustrations of the ravages that may result from plant diseases. In some cases the disease is fairly well understood, and the remedy known; when that is the case the chief need is constant watchfulness, and prompt application of the remedy. But accurate diagnosis is a first essential, and in innumerable cases the nature of the disease is not known, or an efficient remedy has not been found. Since the establishment of the Garden we have had no curator of plant diseases. The City was asked to make an appropriation for such a curatorship in the budget for 1920, but the request was not approved. No scientific need of the Garden is more urgent, or more important.

Docentry.—Much of educational value may result from viewing the objects exhibited in an art gallery, a museum, a zoological park, or a botanic garden, especially if the objects are well labelled and the labels carefully read, and particularly if a printed guide to the collections is available. Nothing, however, can take the place of the living teacher, and this is peculiarly true in connection with plants. The behavior of animals in a zoo is fairly

obvious to all who watch, but hundreds of intelligent people may, for example, pass by a sensitive plant, or a Venus's fly trap in the conservatory without learning anything of the fascinating power of motion of these plants. Instances might be multiplied without number.

As soon as funds can be secured, arrangements should be made for a docent or teaching guide to conduct parties through the conservatories and grounds at stated hours, and also at special times by appointment. This would be specially valuable on Sunday afternoons. Such a service is offered now to a limited extent, and for a fee to members of the Botanic Garden and others, but on certain days and occasions it should be extended to the general public without charge or for a nominal fee, as experience might dictate.

Needs of the Garden

Provision for Research.—Until more nearly adequate provision is made for botanical investigation at the Brooklyn Botanic Garden no other subject can take precedence in a recital of the Garden's needs. The situation just now calls for a slight reorganization of our staff, with provision for additional assistants, and a redistribution of duties, with a view to affording curators more time for research. Certain curatorships, such, for example, as that of public instruction and librarian, will always be chiefly administrative, others will be partly administrative, and it is anticipated that, in the near future, research curatorships may be established. It is a strange historical fact that much, if not most, of the world's advancement in knowledge and understanding has resulted from investigations carried out by men who were really supposed to be doing something else, and were able to conduct their research only at odd hours or during vacation—outside of "official time," and often, if not commonly, with inadequate equipment and under unfavorable and discouraging or even unhealthy circumstances. It is almost, if not quite, within the history of the Brooklyn Botanic Garden that the profession of scientific investigator has come to be generally recognized, even among educational institutions.

A Laboratory or Institute of Plant Pathology

In addition to larger research opportunities for our curators whose duties are partly administrative and closely associated with our scientific collections, the Brooklyn Botanic Garden now faces one of the largest opportunities that ever came to a botanical institution, namely, the need for fundamental investigations into the nature and control or prevention of plant diseases, with special reference to those that affect the health, and wealth, and well being of the inhabitants of a great metropolis like New York. This work is not only of great value from the standpoint of pure science, but is also of the highest economic importance.

The Garden is strategically located for the successful prosecution of various plant disease problems. As an initial project none is more closely related to the commercal life of the metropolis than a study of the transportation and storage diseases of the fruits and vegetables that come into the city markets, not only from domestic growers, but also from the tropics and subtropics. The losses from this cause, in the port of New York alone, amount to hundreds of thousands of dollars annually. The reduction of these losses depends chiefly upon a better understanding of the nature and control of the plant diseases to which they are due. This work, especially certain phases of it, is not now adequately provided for by any existing institution or organization.

An institute or laboratory for the prosecution of such problems should be located in a region having as many as possible of the following qualifications:

1. Easily accessible by rail and otherwise.

2. Having a good soil and an equable climate; a climate not only favorable for crops, but congenial for scientific work 12 months in the year.

3. Near an educational center having large library and herbarium facilities.

4. Having extensive market gardens, commercial greenhouses, and markets of foreign and domestic fruits, vegetables, and ornamental plants.

5. Ample housing accommodations for permanent members of

staff, and for temporary workers, transient visitors, and conventions of scientific organizations.

6. It would also be an advantage for the laboratory to be located at a port of entry where foreign importations of plants are regularly received.

In the matter of location the Brooklyn Botanic Garden fulfills practically all of the above requirements. Within a radius of a few miles is located the greatest market garden development in the United States, together with numerous large nurseries and commercial florists' establishments. Probably the bulk of foreign plant importations into the United States is received at the port of New York.

Agricultural land is available by the acre within twenty minutes automobile ride of the Brooklyn Botanic Garden.

Greater New York is also a strategic location in connection with easy contact with institutions and workers of Great Britain and Europe. Practically every foreign botanist visiting the United States comes to New York.

To properly initiate the work an annual income should be assured of not less than Fifty Thousand Dollars ($50,000).

The director of the Botanic Garden will be very glad to submit details of organization and budget, and to discuss the entire problem with anyone who may be interested.

Acknowledgments

A list of gifts and donors is given in Appendix I (pp. 00–00). It is a pleasure to record here grateful acknowledgment and appreciation of these gifts. Special mention should be made of gifts to the herbarium as follows: Miss Fannie A. Mulford, 4,000 specimens; Dr. R. G. Eccles, 1,669 specimens; Mrs. Elizabeth H. Reichling, 1,294 specimens. It is also a pleasure to express here sincere appreciation to those who have contributed so generously to the Botanic Garden collections fund for 1919.

Accompanying Papers

The Annual Reports of heads of departments, financial statements, and Appendices 1–4, including a list of gifts received,

FIG. 8. Evergreen planting at Malbone St. gate, north side of walk. Bearberry next to the walk.

publications and addresses by members of staff, and meetings held at the Garden during the year, are appended as a part of this report.

Respectfully submitted,

C. Stuart Gager,
Director.

REPORT OF THE CURATOR OF PLANTS FOR 1919

Dr. C. Stuart Gager, Director:

Sir: I take pleasure in submitting herewith my report for the year ending 31 December, 1919.

General Maintenance and Construction Force

Work began on March 10 and ended November 21. During a considerable part of the season we had 20–28 men in the force. Only in the earlier years of heavy construction work have we had more men, and never in the history of the Garden have we been able to keep so many for such a long period. The effect of this, together with an abnormal summer rainfall, was to make the Garden more beautiful, and better kept up than ever in its history. Fresh green lawns, well kept paths, and many of the little details that make gardens attractive were so much in evidence during the summer that everyone who commented on it confirmed our own impression that, perhaps for the first time, the general upkeep of the place came within measurable distance of being what it has always been our hope to make it. The expenditure for labor was very heavy, partly because the very frequent rains demanded almost daily lawn-mowing; and the incentive to match the unusually beautiful mid-summer condition by a corresponding attention to details of upkeep that a dry, dusty summer would have discouraged. The effect of this has been that the actual new work accomplished does not come up to our expectations, nor does it more than one third complete the program we mapped out in our "Items for Development of Grounds for 1919–1920," dated 3 May, 1919. Actual new work accomplished by this force during the year is as follows:

1. Excavation for planting at Malbone Street gate and vicinity.
2. Enlargement of terminal pool and Azalea hill, and preparing soil of latter for planting in 1920.
3. Putting down lawn on east side of the brook on new south extension, formerly occupied by war plantations.
4. Lawn north of children's house.
5. Grading, making terraces and putting down lawn between Washington Avenue and the building.
6. Excavation for Rhododendron planting near the outlet of Lake.
7. Lawn on site of Economic Garden.
8. Excavation and soil preparation for Conservatory Garden planting, (½ completed).
9. Correction and truing up of esplanade terraces at southerly end.

There was also much work besides this in digging hundreds of holes for tree and shrub planting. The force, as before, was under the direct supervision of Mr. Herman Kolsh, with the assistance, for about a month, of Mr. William Collins as assistant foreman. If the force averages over twenty men I recommend the appointment of an assistant foreman for at least the active season of 1920, to replace Mr. Collins who resigned because we were unable to meet the terms of an outside offer.

Gardening Force

The exceptionally heavy rains, and the increased area needing attention threw much more upkeep work on the gardening force than ever before. Besides four gardeners, they had an average of three men from the laboring gang to help. New work for the year includes:

1. Lombardy Poplars planted inside Washington Avenue fence, from service yard to Brighton Beach R. R. cut and along the latter nearly to Malbone Street.
2. Broad-leaved evergreen and Azalea planting at Malbone Street gate on east side of path, matching that on west side completed last year. Also the Azalea plantation between path and Flatbush Avenue about ⅓ completed.

Additional pines also were planted in the background of these plantations during the fall.

3. Privet hedge around children's gardens; on the west side of building and greenhouses; on the top of esplanade terraces at southerly end; at entrance to service gate and vicinity.
4. New beds for Japanese Iris in Japanese Garden, and stepping stone walks through same.
5. Rearrangement of plants and making new beds in the Compositae, Campanulaceae, Dipsaceae and Cucurbitaceae in the systematic collections, to conform to the revised plan of 1 February, 1916.
6. Rearrangements of plants and making new beds for Caryophyllaceae and related families near Magnoliaceae.
7. Filling in with decorative shrubbery planting the families Berberidaceae, Lardizabalaceae, Menispermaceae, Magnoliaceae, etc., with closely related plants, according to a scheme approved by the consulting landscape architect.
8. *Azalea* and *Clethra* planting south of Rock Garden, and *Malus* north of it.
9. Austrian Pine plantation on East side of Lake.
10. Maple and plane trees planted on triangular piece of land belonging to Fire Department bordered by Washington Avenue and Brighton Beach cut (for part of our screen planting).

There has been a good deal of new planting in collections already opened up, particularly in the Iris Garden. The seed list has been issued as usual. The supervision of this work has been by the head gardener, Mr. Free, upon whom also has fallen the major part of the instruction of disabled soldiers, described elsewhere. Among plants from the alpine summits of the northeastern United States brought into the Garden collection as the result of collecting trips by myself or Mr. Free were the Lapland Rhododendron, *Cassiope hypnoides, Daipensia lapponica, Vaccinium Vitis-Idaea,* and many others. Many of them are now in the Rock Garden or in frames.

The greenhouses were closed in June and opened again in November due to construction on the Lily Pools.

Labelling and other Clerical Work

In accordance with the new system of recording plants added to the collections, accession numbers 19–1 to 19–42 were assigned during the year. Dr. Gundersen and Mrs. Burdick have attended to the details of this.

Fig. 9. Manila hemp (*Musa textilis*) in blossom. Economic house.

Gifts to the collection of living plants during the year are recorded in Appendix I of the Annual Report of the Botanic Garden.

A new type of all steel show label for herbaceous plants, four on a single standard, was perfected during the year, and over 600 of them put out. It is planned to replace the wooden labels as they wear out with the new type which is well above the ground and anchored firmly. They are in every way more satisfactory than the old type. The total of labels made during the year was 878, besides many signs, notices, etc.

Phanerogamic Herbarium

Several noteworthy collections have been added during 1919. Among the more important accessions were: Twenty-four Hawaiian ferns as a gift, Miss Josephine Culbertson; 4,000 specimens from Long Island and vicinity as a gift, Miss Fanny A. Mulford; 6,000 specimens collected at the Arnold Arboretum, purchased, Mr. Camillio Schneider, of Vienna; 21 miscellaneous specimens from New York, New Jersey and Vermont, as a gift, Dr. H. M. Denslow; 1,669 specimens, of which 372 were collected on Long Island, as a gift, R. G. Eccles, M.D.

Of these, the specimens collected by Camillio Schneider are of particular importance in naming up our woody collections. That of Miss Mulford is a very welcome addition to our Long Island herbarium. My own collecting includes sets of plants from Mt. McIntyre, Mt. Marcy, Mt. Skylight, in the Adirondacks, and additions to the Long Island herbarium. The specimens mounted during the year were 6,934.

Personal Activities

As a member of the committee on cooperation of the Ecological Society of America, I undertook with others the survey of the region above timber line on Mt. Marcy. A report of this work, including plant and animal studies, is now ready for publication, and in addition the Garden has received a number of Alpine plants for the Rock Garden as a result of this work. My inability to get on Gardiners Island has delayed my studies on the Long Island vegetation, but expeditions to Montauk, Easthampton, and places nearer home has resulted in additions to the herbarium and many notes. Less time was given to such work this

FIG. 10. Woodwork class in the normal course for teachers of children's gardening.

year than before, due partly to labor troubles, the diversity of our development work on the grounds, and the unprecedented difficulty of getting top-soil and some other materials. These details demanded more time during the collecting season than ever before.

Respectfully submitted,

NORMAN TAYLOR,
Curator of Plants.

REPORT OF THE CURATOR OF PUBLIC INSTRUCTION FOR 1919

DR. C. STUART GAGER, DIRECTOR.

Sir: I have the honor to submit herewith my report as curator of public instruction for the year ending December 31, 1919.

Courses of Instruction

A course for the training of gardeners has been added to the four groups of courses of instruction given for some years at the Garden. This course is conducted in cooperation with the Federal Board for Vocational Training, and embraces practical outdoor, as well as indoor, work and study extending over a period of two years. Four ex-soldiers have been taking this work since September, 1919.

The group of courses for Teachers of Children's Gardening has been changed somewhat in number and scope. Instead of the eleven both short and long courses listed in the previous year, a combination of the work has been made in such a manner as to show in this group only five unit courses; but these have all been lengthened to thirty sessions each, thereby lasting from September to May. Further, this work, which is under the efficient direction, as heretofore, of Miss Shaw, has been thrown open as unit courses to teachers in general. These courses have been accepted by the Brooklyn Teachers' Association and appear in their new syllabus. They have also been accepted by the Board of Education for teachers' credits as follows:

1. Any of the courses will be accepted toward meeting clause "*b*" of the conditions of eligibility for high-school license in Biology.

2. The course in Pedagogy of Botany and Educational Principles of Children's Gardening (B_4) will be accepted as a satisfactory 30-hour course in Pedagogy toward meeting the requirement of 60 hours' work in Pedagogy in lieu of the written test in Principles and Methods of Teaching for Promotion License.

3. This course will be accepted as a pedagogical course and either of the other four courses will be accepted as an academic course toward meeting the conditions of exemption from the academic paper in the examination for license as assistant to principal. Such exemption is granted to those who offer 120 hours of satisfactory work, 60 of which must be in the Science of Education, and 60 in some branch of literature, science or art, such 120 hours' work not being accomplished wholly within one academic year.

The following table shows the attendance at the Garden by months, and the annual totals.

TABLE I

ATTENDANCE AT THE GARDEN DURING 1919

	Jan.	Feb.	Mar.	Apr.	May	June	July
At regular classes	297	841	1,514	2,299	1,887	1,788	4,798
At visiting classes	60	226	300	1,008	3,551	2,640	
At lectures to children		351	1,000	760	3,277	1,940	
At lectures to adults			53	100	50	150	
At conservatories	Closed	971	1,015	3,343	1,313	1,126	Closed
Total registration at gates	24,382	21,620	28,220	39,748	40,060	32,295	29,554

	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Totals
At regular classes	3,600	1,626	3,130	1,060	1,012	23,852
At visiting classes		150	5,849	1,652		15,436
At lectures to children		425	3,249	1,852		12,854
At lectures to adults		25	525			903
At conservatories	Closed					7,768
Total registration at gates	27,592	31,908	26,807	23,326	7,261	332,773

In addition to the attendance at the Garden shown above, 17,657 were recorded at 68 lectures given by various members of the staff at schools, clubs, etc., thus making, as in the previous

year, nearly 40,000 people who were reached more or less directly by the educational work of the Garden.

Cooperation with Schools, Etc.

Talks at Schools.—As noted above, sixty-eight talks and addresses were given during 1919, by request, at various schools, clubs and scientific gatherings by members of the teaching staff, with a total attendance of over 17,000.

Study and Loan Material.—Nearly one thousand petri dishes and test tubes, for use in connection with the study of bacteria and molds in courses in Hygiene and Biology, were prepared and filled with nutrient media for twelve different high schools throughout Brooklyn and Manhattan. In addition to petri dishes, study material of various kinds, such as seedlings, spirogyra and other material for microscopic study, etc., was furnished to higher schools and colleges throughout the city and state.

Work with Boy Scouts, etc.—As heretofore, Mr. Stoll has given much of his spare time, evenings and Sundays, in teaching groups of boy scouts and similar organizations of boys and girls, in tree study and other related lines of nature study work. In this way he has come in contact with over 7,000 boys and girls; and of this number he has had nearly 1,000 in regularly organized classes. In addition, he has served during the past year as Deputy Commissioner of the Flatbush District of Boy Scouts of America, as well as examiner in many lines of scout activities.

Cryptogamic Herbarium

The following accessions were made to the cryptogamic herbarium during 1919:

Fungi, gift from Dr. L. E. Melchers, Agricultural College, Manhattan, Kansas	1
Fungi, gift from Mrs. Elizabeth H. Reichling, Brooklyn, as a memorial to her son	1,294
Fungi, gift from Mr. C. A. Schwarze, Woodhaven, Long Island	10
Fungi, gift from Prof. H. M. Fitzpatrick, Cornell University	98
Fungi, gift from Dr. F. J. Seaver, New York Botanical Garden	77
Fungi, by purchase	7,979

Algae, gift from Dr. Emmett D. Page, Brooklyn	42
Mosses, gift from Dr. M. S. Howe, New York Botanical Garden	75
Mosses, gift from Mrs. S. M. Streeter, Brooklyn	100
Total	9,676

Editorial Work

Thirteen numbers of the *Leaflets* were issued during the year, two of which were double numbers. I also acted as one of the editors in charge of the *American Journal of Botany* and of *Botanical Abstracts.*

Field Work

I joined a party of students of fungi, constituting the Northeastern Mycological Club, at Ithaca, June 1–6, in making collec-

FIG. 11. Children's gardens. Taking possession for planting, May 17, 1919. "Old Glory" in advance.

tions and field studies in that rich environment. The fungus collections of the garden were thus considerably augmented. Similarly, our plant disease collections were enriched by collections made while with the party constituting the International Potato Disease Conference, on Long Island, June 24–28; and

with the New England Plant Pathologists in Connecticut, August 18–22. I again employed my summer vacation, in September, in work for the Plant Disease Survey office of the United States Department of Agriculture, in survey and educational work in Connecticut in connection with the recently introduced, serious disease of potatoes known as "potato wart."

In the seven years of my incumbency at the Garden, I have had a dual charge: general direction of a certain portion of the educational work, and also work in connection with the plant diseases of the Garden and with the fungus herbarium. It is of course beyond the powers of any one person to do these two lines of work as they should be done, particularly in view of their rapid growth since the Garden was established. I would, therefore, suggest the creation of a new position, with a Curator of Plant Diseases to have charge of the plant disease work of the Garden, as well as the fungus herbarium, which has now grown to include some 50,000 specimens or more, and is constantly increasing.

Respectfully submitted,

EDGAR W. OLIVE,
Curator of Public Instruction.

REPORT OF THE CURATOR OF ELEMENTARY INSTRUCTION

The Brooklyn Botanic Garden Records of this past year have contained reports of special happenings in the department of elementary instruction. Such special occasions as the graduate party, the children's annual fall meeting, and the boys' and girls' garden exhibit were covered then in reports and need no second rehearsal. So I would submit this year my annual report largely in figures.

In the fall of 1913, the first year this department was organized, three elementary schools, less than one percent of all Brooklyn's elementary schools, manifested an interest in their new Botanic Garden. This past year more than 62 per cent. of the elementary schools have availed themselves of the privileges offered here.

Some schools come to the Garden for special lectures, demonstrations and lessons in school time with their teachers. The following list represents the public elementary schools coming to us for these purposes. These are given by school number.

PUBLIC ELEMENTARY SCHOOLS ATTENDING LECTURES FOR SCHOOL CHILDREN AT THE BROOKLYN BOTANIC GARDEN, 1919

2	15	24	39	62	85	*107	125	140
4	18	25	40	66	89	109	127	148
9	19	26	*41	68	93	113	129	150
10	20	32	42	70	98	117	130	152
11	21	33	49	74	99	119	137	170
12	22	36	61	84B	106	123	139	179

This list represents a total of 54 schools, or 30 per cent. of all the elementary schools of the borough. But these figures do not give one an accurate idea of the number of pupils, the time put in, and the periods of work covered. For example: take the case of P. S. 107. This school registered during the spring and fall for 26 periods. This does not mean 26 classes; but it does mean 26 half days. More than one class came at one time. Suppose 80 boys and girls were registered for a certain morning. These 80 received three periods of work, so that the actual registration for class work should be 240. The report of the Curator of Public Instruction states that the attendance at visiting classes during 1919 was 15,436. But to appreciate the work covered by the children, and the time given by the department of elementary instruction the figure 15,436 should be multiplied by 3. Perhaps the attendance number of 46,308 would help the public to understand the situation at the Botanic Garden. Again to illustrate and illuminate still further: P. S. 84B asked for 16 visits, not for 16 periods, not for 16 classes; but practically 16 half days in which many classes came and many lessons were given: P. S. 39 took 13 visits: P. S. 10, 7 visits. These visits are booked weeks ahead. Besides the elementary schools listed above, the following Brooklyn schools came for similar work: Adelphi Academy; Erasmus Hall High School; Manual Train-

* Schools with stars sent to the Garden all their classes above the third grade.

ing High School Annex; Girls' High School; Bushwick High School; Bay Ridge High School; Brooklyn City Training School; and Brooklyn Training School for Girls; also Ethical Culture School, Manhattan.

The following list of schools represents the elementary schools associated with us through our distribution of "penny packets" of seed, our annual garden exhibit, and our back yard garden contest.

PUBLIC SCHOOLS PARTICIPATING IN GARDEN INTERESTS.

2	18	26	36	47	62	70	82	87	102	110	122	146	154	165
10	20	29	39	48	63	72	83	88	105	112	123	147	155	168
11	21	32	41	49	64	73	84	89	106	117	131	148	157	169
12	22	33	42	51	67	74	85	92	107	118	136	152	159	170
16	25	35	43	52	68	78	86	98	108	120	141	153	162	177
														178

This is a total of 76 different schools, or 42+ per cent. of all the schools of this borough. We should add to this list Adelphi Academy, Girls' High School, Bay Ridge High School, Erasmus Hall High School, Betsy Head Park Garden, McCarren Park Garden, Fort Greene Park Garden, and Highland Park Garden.

Schools come to the Garden for help as follows: for study material, for special courses of instruction to classes from schools, such classes coming without teachers; for conferences on gardening, nature study, etc. These schools are listed together in our third table:

SCHOOLS UTILIZING THE GARDEN FOR EDUCATIONAL AID

Elementary Schools		Private Schools	High Schools
8	109	Adelphi	Brooklyn Training School for Girls
36	114	Berkeley	Bushwick
43	141	Friends	City Training School
52	148	Prospect Heights	Erasmus Hall
56	162	St. Teresa's Parochial School	Eastern District
83	170		Girls' High School
89	62 (Man.)		Girls' High Annex
93			Manual Training High School Annex
98			

The next tabular list shows the schools which supplied us with the boys and girls of our 1919 outdoor garden. These boys and girls worked with us for six months of the past year. There were 320 boys and girls in the garden; 46 schools were represented.

SCHOOLS REGISTERED IN OUR OUTDOOR GARDEN

Elementary Schools			High Schools and Private Schools	Parochial Schools
3	74	138	Adelphi	Brooklyn College
6	85	139	Boys' High	Lady of Mercy
9	89	146	Bushwick	Nativity
10	92	148	Brooklyn Training School for Girls	St. Agnes
26	93		Commercial	St. Augustine
35	98		Eastern District	St. Francis
41	106		Erasmus Hall	St. Joseph
42	107		Girls' High	St. John
47	111		Junior High	St. Teresa
55	124		Manual Training	
57	134		Nathan Hale Junior High	

Again from these figures one learns only a part of the whole. It might be interesting to know that pupils from St. Teresa's school held the greatest number of plots in our garden. It had 54, although a far greater number of children from St. Teresa

ELEMENTARY SCHOOLS SERVED BY BROOKLYN BOTANIC GARDEN, 1919

2	18	35	51	70	88	107	120	136	153	177
3	19	36	52	72	89	108	122	137	154	178
4	20	39	56	73	90	109	123	138	155	
6	21	40	57	74	92	110	124	139	157	
8	22	41	61	78	93	111	125	140	158	
9	24	42	62	82	97	112	127	141	159	
10	25	43	63	83	98	113	128	146	162	
11	26	45	64	84B	99	114	129	147	165	
12	29	47	66	85	102	117	130	148	168	
15	32	48	67	86	105	118	131	150	169	
16	33	49	68	87	106	119	134	152	170	

registered. P. S. 9 had thirty-nine plots, and P. S. 10 twenty-five plots. From this garden, planted, cared for, and harvested by these boys and girls, there was a yield amounting to $3,914.24. The average 8′ × 10′ beginner's plot yielded a crop, the value of which was $16.89, while the larger plots 10′ × 20′ averaged a yield amounting to $34.46 worth of crop.

The last table of schools shows all the elementary schools which participated in any of our activities. It differs a bit from the other tables in that it has added to it those schools calling upon us for lectures at the school itself for the assemblies, graduation exercises, and Mothers' Clubs.

So 62 + per cent. of all the elementary schools of our borough have made use of the garden this year. This does not include private, parochial nor the high schools. The high schools have

Fig. 12. Kindergarten class infringing the rules (!) to gather buttercups and dandelions for their nature study lesson, May, 1919.

all been represented here this year, either by main building or annex students.

The registration number of our regular garden classes, composed of adults and juniors, is 4,056. This is a figure worthy of a large school or a college. Our courses vary in time length from eight weeks to six and ten months.

To summarize: The department of elementary instruction has during 1919 reached 62 + per cent. of all the elementary schools, 100 per cent. of the high schools, a good number of the parochial schools, a small number of the private schools; it has conducted

its regular classes with an attendance aggregating 4,056. With these facts in mind, it is only due to this department to state that 85,000 penny packets of seeds were filled and distributed this year, a range of three greenhouses cared for, forty lectures and talks delivered by the curator of elementary instruction, and a large correspondence and the usual routine office work attended to.

Three industrial exhibits have been placed in schools at the request of the schools. This opens up a new arena of usefulness which we are quite unable to handle without a new teacher of nature study and a man for the greenhouses. This department needs, as has been stated more than once before, an auto-bus to take classes and materials to and from schools. These are our greatest needs without which we must curtail work and diminish our power of usefulness.

Personal Activities

The Curator of Elementary Instruction edited the National Plant, Flower and Fruit Guild Magazine, which appears four times a year—January, March, June and September.

A series of four garden stories for little children, written by me, was released by a newspaper syndicate. These appeared four times; in the fall, winter, spring and summer of 1919. It is impossible to give exact dates as the syndicate failed to send dated copies to the Garden.

ELLEN EDDY SHAW,
Curator of Elementary Instruction.

REPORT OF THE LIBRARIAN FOR 1919

DR. C. STUART GAGER, DIRECTOR.

Sir: I have the honor to submit herewith my report as librarian for the year ending December 31, 1919.

Owing to the appointment of a library assistant in February, a far greater amount of work was accomplished by comparison with preceding years. The librarian was thus freed from such routine work as could be turned over to an untrained assistant and

enabled to devote more of her time to the larger tasks of the library. For example, preparing a tentative list of foreign scientific societies in order to extend our exchange list; making greater progress with the serial shelf list than has been the case in the two preceding years; cataloging the greater part of the Griffiths collection, and revising the pamphlet collection and its catalog.

FIG. 13. Brooklyn Botanic Garden French war orphan fund. Filling a German helmet with pennies at the children's rose arch. The helmet was captured by one of the children's garden "boys," who saw service in France.

Accessions

Among the larger accessions secured by purchase, the most important is the Griffiths collection. In this way we secured 18 volumes of the original edition of Saccardo's invaluable "Sylloge Fungorum." Other publications added to the library are: 31 volumes of the *Bulletin of Miscellaneous Information,* Royal Botanic Gardens, Kew, England; 23 volumes of the *Proceedings* of the American Academy of Arts and Sciences, Boston; 34 volumes of the *Annals* of the Jardin Botanique, Buitenzorg; *The Orchid Album,* 11 volumes; *Revue Horticole,* 5 volumes; *Biologia*

Centrali-Americana, Botany, 5 volumes, ed. by Godman & Salvin; Blum & Fischer's "*Flora Javae*," 3 volumes.

Original copies of the first, sixth, seventh and eighth Annual Reports of the Commissioners of Prospect Park were donated by Mr. Alfred T. White.

Our collection now numbers 6,040 volumes and 8,655 pamphlets, an increase over 1918 of 462 volumes and 974 pamphlets. The increase in parts of publications is 3,119, largely due to the purchase of the Griffiths collection.

Periodicals

Forty-six new periodicals were added to our current periodical file, among which are the *Proceedings* of the Royal Academy of Amsterdam; *Annals of Applied Biology; Journal* of the Arnold Arboretum; *Transactions* of the Bronx Society of Arts and Sciences; *Annals* and *Bulletin* of the Jardin Botanique, Buitenzorg; *Agricultural Gazette* of Canada; *Revista de Agricultura* of the Sociedad Agronómica de Chile; *Economic Proceedings*, New Series, and *Scientific Proceedings*, New Series, Royal Dublin Society; *Bulletin* of the Ecological Society of America; *Geographical Review; Contributions*, New Series, from the Gray Herbarium, Harvard University; *Bulletin of Miscellaneous Information*, Royal Botanic Gardens, Kew, England; *Proceedings* and *Transactions* of the Linnean Society of London; *Transactions* of the Massachusetts Horticultural Society; Museum Work; *Recueil des Travaux Botaniques Néerlandais*, issued by the Société Botanique Néerlandais; *Bulletin* of the Muséum National d'Histoire Naturelle, Paris; *Revue Horticole; Bulletin Agricole de l'Institut Scientifique de Saigon*, Indochina; *Transactions* of the Sapporo Natural History Society; *Journal* of the Botanical Society of South Africa; Technical Notes of the Forest Products Laboratory, U. S. D. A. Forest Service.

Loans

It is interesting to note the different sources from which publications were borrowed for the use of our staff, and we extend our appreciation to the following libraries for the courtesy accorded us: The Brooklyn Museum library; the Brooklyn Public

library; the Library of Congress; the N. Y. Municipal Reference library; Yale University library, and the U. S. Weather Bureau library, New York.

Miscellaneous

Appropriate exhibits were held in conjunction with Dr. Lee's lecture, at a meeting of the School Garden Association of New York; at the Annual Children's Garden Exhibit of the Brooklyn Botanic Garden, and at the annual tea of the Garden Teachers' Association of the Brooklyn Botanic Garden. A list of publications on gardening, canning, drying and storage of vegetables was compiled for distribution at the exhibits.

The New York Public Library kindly forwarded sixty copies of their "Selected List of Books on Flower Gardens," in accordance with Dr. Lee's wish that the list be distributed at her lecture. During the year we received several requests for lists of publications on such subjects as algae, desmids, trees, shrubs. These lists were compiled and forwarded to those asking for them. The U. S. Rubber Company of New York frequently calls us up by telephone for information.

Twenty-six students of the junior class of the Library School of the N. Y. Public Library, conducted by Miss E. W. Tiemann, visited us on the third of October. The librarian gave a short talk on the methods used in the organization of the library, and the arrangement of the catalogs and vertical files. Tea was served in the exhibit room, and the class was taken to the economic house and over the grounds by Dr. Olive and Dr. Gundersen.

Summary

The library purchase from Dr. Griffiths consisted of 548 volumes, 1,024 pamphlets and 6,192 parts, of which 266 volumes, 635 pamphlets and 2,476 parts of publications are new to the library. With the exception of about 100 publications, this entire collection has now been prepared for use and incorporated with our library.

The author's name and short title were printed on the covers of over 4,000 pamphlets. As the collection is bound in pressboard covers and arranged alphabetically by author, this will facilitate finding such pamphlets as are called for.

The remainder of a former gift from the New York Botanical Garden, filling about twelve shelves, was prepared for use.

All hand-written catalog cards without call numbers have been withdrawn from the dictionary catalog. These were forwarded to us by the Brooklyn Museum Library at the time their botanical collection was transferred to the Brooklyn Botanic Garden. Typewritten cards have taken their place.

The nucleus of a good collection of college catalogs is now on the shelves.

The library was represented by the librarian at the meetings of the N. J. Library Association and Penn. Library Club; the American Library Association; the New York Library Club, and the New York Special Library Association.

1920

We shall try to complete the serial shelf list.

Completed sets of periodicals and old and shabby books should be bound at the first possible opportunity.

The pamphlet catalog, consisting of cards 5 × 12.5 cm., should be rewritten on cards 7.5 × 12.5 cm., so that they may be filed in our dictionary catalog. This would eliminate having two catalogs in which to look for entries. As, eventually, we hope to have these pamphlets arranged according to subjects and shelved with the books on the same subjects, it would be an advantage to have all cards in one catalog.

For list of donors and gifts see Appendix I, p. 00. The statistical report follows:

STATISTICAL REPORT ON THE LIBRARY

Accessions

	Volumes	Pamphlets	Parts (including Periodicals)	
Exchange	31	40	2,144	
Gift	57	232	1,865	
Publication	0	21	149	
Purchase	374	46	608	
Deposit	0	0	8	
Total	462	339	4,774	
		635	2,476	Griffiths' Collection
Grand Total		974	7,250	

Total number of parts of publications added to the library in 1919, including current periodicals	7,250
Increase over 1918	3,114
Total number of volumes in library December 31, 1918	5,578
Total number of volumes added during 1919	462
Total number of volumes in library December 31, 1919	6,040
Total number of pamphlets in library December 31, 1918	7,681
Total number of pamphlets added during 1919	974
Total number of pamphlets in library December 31, 1919	8,655
Total number of volumes and pamphlets in library December 31, 1919	14,695
Increase in number of volumes and pamphlets	1,436

Serial Publications

Count of periodicals, state and federal documents, and society publications currently received during 1919:	
Subscription	48
Gift	44
Exchange	290
Deposit from Brooklyn Public Library	2
Publication	5
Total	389
Increase	46

Miscellaneous Statistics

Index cards of the U. S. experiment stations on file in library, December 31, 1918	6,799
Experiment station index cards added by purchase during 1919	120
Total number of experiment stations index cards on file in the library, December 31, 1919	6,919
Torrey Botanical Club index cards on file in the library, December 31, 1918	26,510
Torrey Botanical Club index cards added by purchase during 1919	1,246
Total number of Torrey Botanical Club index cards on file December 31, 1919	27,756
Index Algarum Universalis cards, December 31, 1918	9,899
Added by purchase during 1919	0
Total, Index Algarum Universalis cards, December 31, 1919	9,899

Cards added to shelf list	529
Cards added to dictionary catalog	1,518
Cards added to pamphlet catalog	1,053
Cards added to current periodical catalog	76
Cards added to catalog of duplicates	326
Total, typewritten cards	3,502
Books loaned to members of staff	672
Numbers of readers in library, approximately	1,396
Volumes entered in accession book	462
Number of letters written	179
Books loaned to other institutions	5
Books borrowed from other institutions	34
Lantern slides on file December 31, 1918	2,321
Lantern slides accessioned during 1919	353
Total number of lantern slides on file December 31, 1919	2,674
Photographic negatives on file December 31, 1918	3,017
Negatives accessioned during 1919	334
Total number of negatives on file December 31, 1919	3,351

Respectfully submitted,

RAY SIMPSON,
Librarian.

FINANCIAL STATEMENTS FOR 1919

I. Maintenance Account

1360	*Personal Service:*	
	Appropriation	$41,736.51
	Expended	41,736.51
1361	*Other Codes than Personal Service:*	
	Appropriation	$ 6,263.49
	Expended	6,263.49
	Summary of Maintenance Accounts:	
	Appropriation by the City for maintenance	$48,000.00
	Expended	48,000.00

II. Private Funds Accounts

1.	*Endowment Fund* ($78,000.00) (*Restricted* in part):	
	Income Account:	
	Balance, January 1, 1919	$ 2,534.26
	Income, 1919	3,900.00
	Transferred from Gager Memorial Fund (in part payment of Griffiths Collection)	625.00
		$ 7,059.26

Transferred to Special Contributions	$5,212.34	
Expended	1,846.92	7,059.26

2. *Cary Library Fund* ($10,000.00; ⅕ to B.B.G.) (*Restricted*):

Income Account:		
Balance, January 1, 1919		$ 54.87
Income, 1919 (Pro rata share, ⅕ total income)		100.00
		$ 154.87
Expended		129.46
Balance, December 31, 1919		$ 25.41

3. *George C. Brackett Library Fund* ($500.00) (*Restricted*):

Income Account:		
Balance, January 1, 1919		$ 43.78
Income, 1919		25.00
		$ 68.78
Expended		3.35
Balance, December 31, 1919		$ 65.43

4. *Benjamin Stuart Gager Memorial Fund* ($10,000.00) (*Restricted*):

Income Account:		
Balance, January 1, 1919		$ 400.50
Income, 1919		800.00
		$ 1,200.50
Expended	$ 48.90	
Transferred to Endowment Fund Income Account	625.00	637.90
Balance, December 31, 1919		$ 526.60

5. *Martha Woodward Stutzer Memorial Fund* ($5,000.00) (*Restricted*):

Income Account:		
Balance, January 1, 1919		$ 31.25
Income, 1919		218.75
		$ 250.00
Expended		0.00
Balance, December 31, 1919		$ 250.00

6. *Special Fund* (*Restricted*) (Brooklyn Institute Endowment Allotment):

Income Account:		
Balance, January 1, 1919		$ 5,826.41
Income, 1919		3,560.00
Transferred to Special Contributions	$9,338.73	$ 9,386.41
Expended	47.68	9,386.41

7. *Botanic Garden Collections, 1918 (Restricted):*		
Balance, January 1, 1919		$ 102.78
Expended	$ 101.30	
Transferred to B. G. Collections, 1919	1.48	102.78
8. *Botanic Garden Collections, 1919 (Restricted):*		
Received from contributions, 1919		$12,941.50
Transferred from Collections, 1918		1.48
		$12,942.98
Transferred to Special Contributions (at request of donors)	$6,865.74	
Expended	4,885.27	11,751.01
Balance, December 31, 1919		$ 1,191.97
9. *Special Purposes Account* (*Restricted* by terms of gift):		
Special gifts for Conservatory Garden, Japanese Garden, Prizes for Children's Gardens, and Plans for Rose Garden.		
Received		$18,254.12
Expended		18,254.12
10. *Sustaining Membership (Restricted):*		
Balance, January 1, 1919		$ 467.73
Received from dues, 1919		460.18
		$ 927.91
Expended		850.88
Balance, December 31, 1919		$ 77.03
11. *Annual Membership (Restricted):*		
Balance, January 1, 1919		$ 41.11
Received from dues, 1919		840.00
		$ 881.11
Expended		875.64
Balance, December 31, 1919		$ 5.47
12. *Tuition and Sales (Restricted):*		
Balance, January 1, 1919		$ 1,135.34
Received, 1919:		
(*a*) Instruction	$ 336.00	
(*b*) Penny seed-packets	1,681.63	
(*c*) Incidental Account	379.33	2,396.98
		$ 3,532.32
Expended		1,698.24
Balance, December 31, 1919		$ 1,834.08

13. *Special Contributions* (For 1919 only):

Received from contributions			$ 6,045.88
Transferred from Collections, 1919, Account			6,865.74
Transferred from Endowment Fund			5,212.34
Transferred from Special Fund			9,338.73
			$27,462.69
Expended			27,462.69

Summary of Private Funds Accounts:

Balance, January 1, 1919			$10,638.03
Income, 1919:			
Restricted:			
Endowment Fund	$ 150.00		
Cary Library Fund	100.00		
Brackett Library Fund	25.00		
Gager Memorial Fund	800.00		
Stutzer Memorial Fund	218.75		
Special Fund	3,560.00		
Collections Fund	12,941.50		
Special Purposes Account	18,254.12		
Sustaining Membership	460.18		
Annual Membership	840.00		
Tuition and Sales	2,396.98	$39,746.53	
Not restricted:			
Endowment Fund	$ 3,750.00		
Special Contributions	6,045.88	9,795.88	49,542.41
			60,180.44
Expended			56,204.45
Balance, December 31, 1919			$ 3,975.99

APPROPRIATIONS OF CORPORATE STOCK AND TAX NOTES OF THE CITY OF NEW YORK FOR PERMANENT IMPROVEMENTS, AND EXPENDITURES THEREFROM DURING 1919

C.D.P. 200-M (*$100,000.00*) *For Improvement of the Brooklyn Botanic Garden*

Balance, January 1, 1919	$ 110.51
Expended	98.00
Balance, December 31, 1919	$ 12.51

S.-566 (*$100,000.00*) *Suspense Account, Contributions for Brooklyn Botanic Garden Improvement Fund*

Balance, January 1, 1919	$ 247.82
Expended	153.00
Balance, December 31, 1919	$ 94.82

C.D.P. 200-R (*$5,000.00*) *For Extension of Underground Coal Cellar of Brooklyn Botanic Garden*

Appropriated July 18, 1919 (Tax Notes)		
For cost of work	$4,750.00	
For Inspector (2 mos. @ $1,500 a yr.)	250.00	$ 5,000.00
Expended		0.00
Balance, December 31, 1919		$ 5,000.00

APPENDIX 1

GIFTS RECEIVED DURING 1919

Collections Fund

Anonymous	Mrs. John Hills	William A. Putnam
Mrs. John Anderson	Miss Frances T. Ingraham	Harold Somers
E. Addie Austin	A. W. Jenkins	Herman Stutzer
Samuel P. Avery	Martin Joost	Hannah M. Sweeton
Edith B. Brainerd	E. R. Kennedy	Mrs. E. L. Uhrbrock
William Brown	L. W. Lawrence	Mary Van Norden
Walter H. Crittenden	Florence E. Longstreet	Alfred T. White
Albert de Silver	Mrs. John Bradley Lord	The Misses White
John Enequist	Mrs. W. D. Munson	W. A. White
J. W. Frothingham	Henry F. Noyes	Mrs. F. Willenbrock
A. Augustus Healy	George D. Pratt	

Total Subscriptions $12,942.98

Prizes

Mr. Alfred T. White, as follows:

War Savings Stamps (14)	$ 58.10
Thrift Stamps (200)	50.00
Silver cups (4)	32.56
Silver medals (50)	96.52
Bronze medals (50)	61.53
Total	$298.71

Plants, Seeds, and Bulbs

Andorra Nurseries (27)	Miss Elma Loines (2)
Dr. R. C. Benedict (53)	Mrs. Grace D. McDougal (1)
Mr. F. Bogeman (2)	Mr. W. A. Manda (12)
Elm City Nursery Company (1)	Mr. Aschne Moe (1)
Mr. Irving Holcomb (1)	Peterson Nurseries (7)
Mr. Isaac Hicks (1)	Mr. William Tell (2)
Mr. E. Fred Knauth (1)	Mr. Alfred T. White (2)
Mr. A. S. Keledjian (1)	Mr. Charles Zeller (1)
Mr. William Keller (1)	Mrs. M. C. B. Lindsey (1)

Total, 117

Herbarium

PHANEROGAMIC

Dr. H. M. Denslow (21)
Dr. R. G. Eccles (1,669)
Miss Fanny A. Mulford (4,000)

CRYPTOGAMIC

Miss Josephine Culbertson (24)
Prof. H. M. Fitzpatrick (98)
Dr. M. A. Howe (75)
Dr. L. E. Melchers (1)
Dr. Emmett D. Page (42)
Mrs. E. H. Reichling (1,294)
Mr. Carl A. Schwarze (1)
Dr. Fred J. Seaver (77)
Mrs. S. M. Streeter (100)

Total, 7,402

Library

Books

American Scenic and Historic Preservation Society	1
Mr. Leonard Barron	30
Miss Josephine Culbertson	1
Mr. Montague Free	1
Dr. C. S. Gager	15
Mr. John N. Harmon	5
Mrs. C. R. Hyde	4
John Crerar Library	1
Mr. G. A. Reichling	4
Miss Ellen Eddy Shaw	3
Mrs. Annie Morrill Smith	2
Mr. John Stephens	1
University of Utrecht	1
Total	69

Pamphlets

Mr. H. F. Bergman	4
Dr. Ernst A. Bessey	2
Dr. S. C. Brooks	2
Dr. F. S. Collins	1
Miss Miriam S. Draper	1
Prof. Winfield Dudgeon	3
Dr. O. A. Farwell	11
Dr. H. M. Fitzpatrick	3
Dr. F. D. Fromme	3
Dr. C. S. Gager	122
Mr. Philip Hadley	2
Dr. R. M. Harper	1
Dr. J. W. Harshberger	6
Dr. Arthur Hollick	23
Dr. J. L. Lunnell	15

National War Garden Commission	1
Dr. P. J. O'Gara	2
Dr. J. K. Small	7
Prof. Neil E. Stevens	22
Mr. J. J. White	1
Total	232

Parts of Publications, Exclusive of Government Publications

American Balsa Company	2
American Forestry Association	2
Mr. Leonard Barron	2
Bronx Society of Arts and Sciences	3
Cape Cod Cranberry Growers Association	8
Mr. Edwin B. Chamberlain	20
Miss Bertha M. Eves	78
Ewing Christian College	4
Mr. Montague Free	12
Dr. C. S. Gager	58
Havana, Cuba. Revista de Agricultura Comercio y Trabajo	9
Dr. Arthur Hollick	2
Massachusetts Forestry Association	2
Mellen Institute of Industrial Research and School of Special Industries.	10
National War Garden Commission	6
Nature Notes	2
New York Zoological Society	1
Mrs. H. E. Saunders	47
Miss Ellen Eddy Shaw	12
Mrs. Annie Morrill Smith	38
Society for Experimental Biology and Medicine	1
Mr. Norman Taylor	8
Mr. Alfred T. White	6
Dr. O. E. White	2
Total	335

Department of Elementary Instruction

Feb. 14. $ 7 from the Home and Country Committee of the Chiropean Club.

April 23. $ 1 from a friend.
$ 1 from a friend.

April 25. $15 Mrs. C. E. Donnellon.

May 6. $10 from the Beth Sholom Sisterhood.

June 25. $ 5 Mothers' Club, P. S. No. 124.

July 1. Alligator pear plant from Dr. J. T. Lamoutte.

Oct. 7. Henslow's "Botanical Charts" and Key to same, Miss E. J. Carr.

Oct. 18. A German helmet, Private Maurice Campbell.
$35 By the Boys' and Girls' Club for the support of a French orphan.
$25 By the Boys' and Girls' Club for purchase of a gift for the Directors' private office.
Dec. 13. A brass samovar by the Teachers' Class, 1918.
Shaft for a sundial to be placed in the children's garden by the Teachers' Class, 1919.

APPENDIX 2

PUBLICATIONS OF MEMBERS OF STAFF DURING 1919

Caparn, Harold A.

—— War memorials, *Newark (N. J.) Sunday Call.* March 16.
—— Planning the outdoor room, *The Independent,* pp. 22–23, etc. Ap. 5.
—— A billboard catechism, *Landscape Architecture,* pp. 76–78. Ap.
—— Architecture and the greenhouse, *Architecture,* pp. 153–156. June.

Free, Montague

—— Making a lawn. *Brooklyn Botanic Garden Leaflets,* **VII**[1]. April 2.
—— Proper way to grade and prepare a permanent lawn. *The Sun,* New York. April 20.
—— The rock garden. *Brooklyn Botanic Garden Leaflets,* **VII**[3]. April 30.
—— New-fashioned flowers for old-fashioned gardens. *The Sun,* New York. May 4.
—— Flowers of the rock garden. *Brooklyn Botanic Garden Leaflets,* **VII**[4]. May 7.
—— Successful window boxes and porch gardens. *The Sun,* New York. May 11.
—— Autumn maneuvers with the soil. *The Sun,* New York. Nov. 9.
—— The garden of hardy plants. *Brooklyn Botanic Garden Leaflets,* **VII**[10 and 11].

—— Business houses and horticultural exhibitions. *The Sun,* New York. Nov. 23.

—— It is now time to put winter clothes on the garden. *The Sun,* New York. Nov. 30.

—— Commercial propagation of tree fruits. (Review.) *Journal of International Garden Club* **3**: 4.

Gager, C. Stuart

—— A laboratory guide for general botany. Second edition, pp. i–x + 206. Philadelphia. P. Blakiston's Son Co. February 18.

—— Boerker's Our National Forests. (Review.) *Torreya* **19**: 14–15. Jan.

—— (A Botanic Garden for Norwich, N. Y.) Letter in the Norwich *Sun* (March 27) and the *Semi-Weekly Telegraph.* March 28.

—— Horticulture as a profession. *Science* N. S. **49**: 293–300. Mch. 28.

—— Eighth annual report of the Brooklyn Botanic Garden, 1918. Report of the Director. *Brooklyn Bot. Gard. Record* **8**: 25–49. April.

—— Macfarlane's Causes and Course of Organic Evolution. (Review.) *Torreya* **19**: 93–101. May.

—— Educational conference on biology in New York City high schools. (With Louisa Bruckman). *Brooklyn Bot. Gard. Record* **8**: 95–121. July.

—— Statements of high school principals as to the value of general biology in the high schools of Greater New York. *Brooklyn Bot. Gard. Record* **8**: 121–126. July.

—— A basis for deconstructing botanical education. *Science* N. S. **50**: 263–269. Sept.

—— Evolution and Darwinism. (Reprint of Chapters XXXI and XXXII of Gager's Fundamentals of Botany.) In *English, Science, and Engineering,* by Eason and Weseen, Chap. IX, pp. 115–131. New York. Doubleday Page & Co. 1919.

—— Various abstracts of papers dealing with botanical education. *Botanical Abstracts* **1–2.**

Gundersen, Alfred

—— Trees of Prospect Park and Brooklyn Botanic Garden. *Brooklyn Bot. Gard. Leaflets* **VII**[7]. June 18.

—— Some Brooklyn weeds. *Brooklyn Bot. Gard. Leaflets* **VII**[9]. Oct. 29.

—— Trelease's Plant materials and winter botany. (Review.) *Torreya* **19**: 78–79. Ap.

—— Various abstracts in *Botanical Abstracts* **1–2.**

Olive, Edgar W.

—— Report of the Curator of Public Instruction for 1918. *Brooklyn Bot. Gard. Record* **8**: 60–64. Ap.

—— Key to some of the principal families of flowering plants. *Brooklyn Bot. Gard. Leaflets* **VII**[5]. May 21.

—— The living soil. *Brooklyn Bot. Gard. Leaflets* **VII**[8]. Oct. 15.

—— Various abstracts on papers dealing with Fungi in *Botanical Abstracts* **1–2.**

Shaw, Ellen Eddy

—— Report of the Curator of Elementary Instruction for 1918. *Brooklyn Bot. Gard. Record* **8**: 66–70. Apr.

—— Report of Sixth Annual Exhibit for Brooklyn Boys and Girls. *Brooklyn Bot. Gard. Record* **8**: 138–142. Oct.

—— Sixth Annual Exhibit for Boys and Girls. *Brooklyn Bot. Gard. Leaflets* **VII**[2]. Apr. 16.

Simpson, Ray

—— Report of the Librarian for 1918. *Brooklyn Bot. Gard. Record* **8**: 70–76. April.

Taylor, N.

—— The small place. Its landscape architecture. (Review.) *Jour. Int. Garden Club* **3**: 196. March.

—— Report of the Curator of Plants for 1918. *Brooklyn Botanic Garden Record* **8**: 51–60. April.

—— Plant Quarantine No. 37. *Journ. Int. Garden Club* **3**: 329–331. June.

—— Britton & Rose's Cactaceae. (Review.) *Torreya* **19**: 200–203. October.

—— Rock's Lobelioideae of Hawaii. (Review.) *Torreya* **19**: 228–230. Nov.

—— A brief guide to the conservatories. *Brooklyn Bot. Gard. Leaflets* 7^{12-13}: 1–8. November 26.

—— Various abstracts in *Botanical Abstracts* **1–2**.

White, Orland E.

—— Numerous abstracts. Genetic department of *Bot. Abstracts* **1–2**.

—— Harwood's New Creations in Plant Life. (Review.) *Torreya* **19**: 15–17. January.

APPENDIX 3

PUBLIC LECTURES, ADDRESSES, AND PAPERS GIVEN BY MEMBERS OF STAFF DURING 1919

By the Director of the Garden:

April 25. *Arbor Day Address.* Curtis High School, Staten Island (Borough of Richmond).

By the Curator of Plants:

August 1. *California wild flowers.* Newport Garden Club.

August 13. *Cultivation of woodland plants.* New Canaan Garden Club.

By the Curator of Public Instruction:

January 29. *The Baltimore meetings of the Botanical Society of America and the American Phytopathological Society.* New York Botanical Garden.

February 11. *Plant disease survey work in New York, Virginia and Pennsylvania.* Torrey Botanical Club, at American Museum of Natural History.

March 29. *Some crop diseases studied during the summer of 1918.* Conference at the Brooklyn Institute of Arts and Sciences, Academy of Music.

August 20. *The botanic garden and the public.* Conference of New England Plant Pathologists, at Agricultural College, Storrs, Connecticut.

October 11. *Fleshy Fungi.* Field trip of the Torrey Botanical Club, at Cold Spring Harbor, Long Island.

November 8. *Plant diseases.* Field trip of the Botanical Department of the Brooklyn Institute, at Valley Stream, Long Island.

By the Curator of Elementary Instruction:

February 6–March 6. *The small vegetable garden.* To the alumnae at Froebel League, Manhattan.

February 14. *The work of the Brooklyn Botanic Garden.* To the Educational Committee of the Chiropean Club at home of Mrs. C. E. Donnellon, 849 Carroll St.

February 20. *Nature study for children.* Mothers' Club, P. S. No. 85.

March 4. *Nature study for children.* Mothers' Club, P. S. No. 47.

March 14. *School gardens.* Assembly, Manual Training H. S. Annex.

March 17. *Children's gardens.* Mothers' Club, P. S. No. 90.

March 18. *Children's gardens.* Mothers' Club, P. S. No. 41.

March 19. *What the Brooklyn Botanic Garden does for Brooklyn children.* Woman's Chapter Temple.

March 20. *What the Brooklyn Botanic Garden does for Brooklyn children.* Chiropean Club at the Pouch Gallery.

March 22. *Garden work for children.* Federation of Women's Clubs, Schenectady.

April 1. *Garden work for children.* Assembly, P. S. No. 36.

April 1. *Garden work.* Assembly, Bushwick High School.

April 10. *Gardens.* Assembly, Girls' High School.

April 10. *Gardens for Little People.* Queens Kindergarten Association, Jamaica Training School.

April 23. *Children's gardens.* Mothers' Club, P. S. No. 35.

April 23. *The work of the Brooklyn Botanic Garden for children.* Prospect Club.

April 24. *Children's gardens.* Mothers' Club, P. S. No. 57.

April 29. *Children's gardens.* Mothers' Club, P. S. No. 154.

April 30. *Children's gardens.* Mothers' Club, P. S. No. 81 (Queens).

May 1. *What the Brooklyn Botanic Garden does for Brooklyn boys and girls.* Parents Club, P. S. No. 85.

May 6. *What the Brooklyn Botanic Garden does for Brooklyn boys and girls.* Women's Club of the Flatbush Congregational Church.

May 7. *What gardens signify in a child's life.* Long Island Librarians' meeting at Pratt Library.

May 15. *Common trees.* Assembly, Berkeley Institute.

May 14. *Children's gardens.* Mothers' Club, P. S. No. 178.

May 15. *Garden work for children.* Meeting of Kindergarten Association of Physicians and Surgeons Settlement Club.

May 23. *Gardens.* Two assemblies, P. S. No. 41.

June 6. *Plants easy to raise.* Two assemblies, P. S. No. 62, Manhattan.

June 6. *Gardens for children.* Mothers' Club, P. S. No. 137.

June 11. *Gardens for children.* Garden Club, New Canaan, Connecticut.

June 25. *Graduation Address.* P. S. No. 88, Queens.

September 23. *Bulbs and how to grow them.* Mothers' Club, P. S. No. 128.

September 25. *Bulbs and how to grow them.* Mothers' Club, P. S. No. 90.

October 21. *What nature reveals to a child.* Kindergarten Association of Brooklyn, Brooklyn City Training School.

November 5. *Industrial plants.* Two assemblies, P. S. No. 62, Manhattan.

November 19. *What the Brooklyn Botanic Garden does for boys and girls.* Library School, Central Library, Manhattan.

November 20. *What the Brooklyn Botanic Garden does for boys and girls.* Mothers' Club, P. S. No. 97.

November 21. *Address at distribution of prizes to children.* Garden Club, New Canaan, Conn.

December 2. *What the Brooklyn Botanic Garden is doing for Brooklyn's children.* Ladies' Organization of Central Congregational Church.

December 4. *House plants.* Mothers' Club, P. S. No. 66 (2).

December 15. *Industrial plants.* Assembly, P. S. No. 8.

By the Assistant Curator of the Herbarium:

October 24. *Plants of fall and winter.* Before the Flatbush Garden League, at the Botanic Garden.

December 30. *A diagrammatic representation of the main groups of vascular plants.* Botanical Society of America, at St. Louis. (Presented by Dr. C. Stuart Gager.)

By the Librarian:

October 3. *The methods used in the organization of the library of the Brooklyn Botanic Garden.* Before the junior class of the Library School, New York Public Library.

By the Consulting Landscape Architect:

March 15. *War memorials.* Before the New York Chapter, American Society of Landscape Architects.

By the Head Gardener:

March 5. *Vegetable growing.* Brooklyn Botanic Garden.

March 12. *Vegetable growing.* Brooklyn Botanic Garden.

March 19. *Vegetable growing.* Brooklyn Botanic Garden.

June 2. *Flower gardens.* Women's Club, Great Neck.

November 13. *Alpine and rock plants.* International Garden Club, Irvington-on-Hudson.

APPENDIX 4

MEETINGS OF ORGANIZATIONS AND SOCIETIES AT THE GARDEN, 1918

March 21. Flatbush Garden League (and bi-monthly until December 5).

March 22. Appalachian Mountain Club.

March 25. Torrey Botanical Club.

April 4. Educational conference on biology in the City of New York High Schools.

April 30. Mothers' Club, Public School 24, Brooklyn.

June 7. School Garden Association of New York City.

October 3. Library School of New York Public Library.

November 16. Inkowa Club of New York City.

See also p. 37.

FORMS OF BEQUEST TO THE BROOKLYN BOTANIC GARDEN

Form of Bequest for General Purposes

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which said sum to be used for the educational and scientific work of the Brooklyn Botanic Garden.

Form of Bequest for a Curatorship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, as an endowment for a curatorship in the Brooklyn Botanic Garden, the income from which sum is to be used each year towards the payment of the salary of a curator in said Botanic Garden, to be known as the (here may be inserted the name of the donor or other person) curatorship.

Form of Bequest for a Fellowship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which sum is to be used in the payment of a fellowship for advanced botanical investigation in the Brooklyn Botanic Garden, to be known as the.....fellowship.

Form of Bequest for other particular purposes designated by the testator

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, to be used (or the income from which to be used) for the Brooklyn Botanic Garden* .....

.....

* The following additional purposes are suggested for which endowment is needed:

1. The beautifying of the grounds.
2. The purchase of publications for the library.
3. Publishing the results of botanical investigations.
4. Popular botanical publication.
5. The endowment of a lectureship, or a lecture course.
6. Botanical illustration for publications and lectures.
7. The purchase or collection of plants.

FIG. 14. *Coccothrinax crinita* in the conservatory of the Brooklyn Botanic Garden.

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

RECORD

VOL. IX July, 1920 NO. 3

THE SCHOOL GARDEN AS A MEANS OF EDUCATION*

You are going out as teachers of a subject that is somewhat new as a part of the school program in this state. School gardens, however, are not new. In European countries they have been conducted as a means of education for nearly a century. Even in this country the work has become so general that the literature relative to it is abundant.

This afternoon I desire to discuss the school garden as a means of education and in discussing this subject I shall endeavor to treat it broadly and in a true educational sense.

Therefore, at the outset it will be well for us to have a clear understanding of the meaning of education.

In China education is based on memory. There pupils are required to commit all lessons to memory whether they be in number, or history, or geography, or language, or literature. It is literally a "pouring in" process. The result is that the Chinese pupil becomes one-sided. He possesses a remarkable store of facts and figures but when it comes to using those facts and figures to initiate something worthwhile, to build a railroad for

* Address delivered on December 13, 1919, at the exercises in connection with awarding certificates in Children's Gardening at the Brooklyn Botanic Garden.

instance, he finds it necessary to call for the help of those who have been trained under a different system of education.

The brain of those trained under a "pouring in" system becomes merely a receptable for facts. Facts and figures are poured in as water is poured into a bottle. After a time the bottle is full and the water runs over. If the bottle is made of rubber it may be stretched somewhat but there is also a limit to the capacity of rubber bottles.

The cataract of Niagara produced energy that would have turned millions of wheels in factories, that would have propelled the cars in thousands of villages and cities, and that would have lighted miles of streets long before it was harnessed and made useful for those purposes.

Stored-up facts like stored-up energy are useless. It is only when the present and the future are interpreted by the facts gathered from the past that facts become useful. Niagara was beautiful long before it was useful. But as a thing of beauty it afforded pleasure to a few only, who because of good fortune, had the opportunity to see it and to study the mystic colors of the rainbows of its eternal mists.

A good memory is desirable. This faculty should not be neglected in any system of education. The absent-minded individual is to be pitied. The husband who carries home a pound of tea when his wife sent him for a pound of sugar is short on memory, and this may cause some difficulty, but the same individual may have the ability to initiate and carry on business that furnishes employment to thousands, and that produces something to feed or clothe or make happy his fellow man.

We believe it is necessary to develop a good memory, but we believe more in a kind of education that develops the other inherent faculties as well.

Education is not a pouring-in process. It is a developing process. This is an age of mental hygiene and mental tests. We apply the Binet test to determine the capacity of the mind to develop. A properly organized system of education no longer gives all pupils the same training although they may enter as many different vocations as there are individuals. We recognize

the inherent capacity of each and do not recommend that one who has the capacity to become a first-class surveyor should endeavor to become a practitioner at the bar.

Let us analyze the word "education." It is derived from two Latin words *e-* meaning *out* and *duco* or *ducere* meaning *to lead* or *to draw*. Its root meaning therefore is to lead or draw out. It is a drawing out or a developing process. Plato, the old Greek philosopher, said, "Good education is that which gives to the body and to the soul all the perfection of which they are capable."

Let the body be so developed that there is not a dormant muscle; that every heart beat is in tune; that every organ is discharging its work properly; that every proportion is natural; that every fiber of the whole physical being is sensitive to the purpose for which it has been created, then, according to Plato, is the body educated. Add to this the soul for the soul is all there is of man, besides the mere physical nature, completely perfected, intellectually, morally and spiritually and according to the same authority we have a well educated individual.

Let us see how school gardening fits into an educational system founded on Plato's definition. We are interested in food production but we are not interested in the school garden as a food producing proposition primarily. We believe in it first as a means of education in the true meaning of the word.

1. An adequate educational program must consider health and physical development. Without good health mental development may be retarded. Therefore, I would first emphasize physical development and health, health as expressed in terms of sunshine, fresh air, exercise and pure food. The school garden offers an opportunity for health education. Tell the boy to go out into the fresh air and sunshine because he needs physical development and he is likely to prefer to stay in the house and read Andersen's "Fairy Tales." Invite him to participate in a ball game, get him interested in caring for a garden and he will get the fresh air and the sunshine and the exercise that he needs. We like to do the things that we have an interest in doing. Public playgrounds, parks and gardens are not a fad or a luxury. They are as much of necessity as dispensaries and hospitals. I

leave the question of health not because it is important but in order that I may discuss the value of garden work as a means of education in mind and character training and development.

2. School gardening affords an opportunity to bring children into contact with their environment. Too many people are out of touch with their natural surroundings. They have not learned to see. Garden work is work with nature. How many people grow to manhood and womanhood without learning to appreciate the beautiful things in nature that are all around them! This work develops a love for nature. It may be difficult to love a potato or a carrot or a tomato but one can easily love a garden. The boy or the girl who prepares the soil, plants the seed, cares for the little shoot as it breaks through the earth, waters the plant, trims the vine, sprays the leaves to keep off the destroying insects, and finally harvests the crop, has learned some valuable lessons. He has learned to look for and to see some things that he has never looked for and seen before. He is a better observer and good observation is a necessary attribute of good education.

3. The school garden teaches generosity. It teaches the boys and the girls that before it will give anything in return it is necessary that much shall be given; good soil, good seed, good fertilizer; good care. It is give, give, give, in caring for a garden; but in the end the garden returns many times more than has been given. It teaches that reward only comes as a result of painstaking effort in worthwhile undertakings. "Cast thy bread upon the waters and after many days it shall return unto thee," is a principle of education.

A generous nature is necessary to a well-rounded education. The school garden helps to develop this.

4. School gardening teaches self-respect. Did a boy ever take you to his plot or to his back yard to show you his garden. If he invited you to go it was probably a good garden. Did he hang his head and blush while showing it to you? Or did he give evidence of thinking well of himself because of his accomplishment? Did you ever know a school girl who was ashamed of the garden of flowers which she had cultivated and made a thing of beauty?

I must tell you of a personal experience. Last summer while visiting the City of Rochester I was invited by the garden supervisor to inspect some of the children's gardens. In Rochester they have a fine program of gardening which includes both plot gardens in connection with the schools and home gardens at the homes of pupils. Both school gardens and home gardens are under supervision and the work is done as a part of the school program.

Among the gardens inspected we visited the home garden of an Italian boy. To reach the garden we were obliged to go through the father's store. The father did not understand English well (the boy was not with us at the time). With some difficulty we made him understand that we desired to see the boy's garden. When the father understood he was very proud to direct us to the garden and he did so with a great deal of deference. Working our way around the grocery boxes, the cases of oranges and the baskets of vegetables we went as directed through the store and out the back door. There we found the boy and nearby was the boy's garden. Proudly the little chap unlocked the door, for the garden was surrounded by a high wire fence, and the door leading to it was locked. When inside we saw corn, and tomatoes, and potatoes, and lettuce, and radishes, and spinach, and several other vegetables, in a variety of stages of growth and maturity. The boy was quick to tell us how much money he had made from the vegetables that he had already harvested. But what impressed me was the way he looked me in the eyes when he told me about it. I could not help but feel that he was more likely to become a good self-respecting American citizen as a result of his experience in raising that garden. I felt that I knew that father and that boy pretty well before I left them. The garden furnished a pretty good point of contact.

Statements made by many school superintendents and by several garden supervisors convince me that school gardening is an excellent agent in work of Americanization.

5. The school garden affords a means of help in developing the inborn instincts. What are some of these instincts? Into what may they develop? Consider, for instance, the special

human instinct of acquisitiveness. Strongly developed it results in frugality and is the basis of private ownership of property. Underdevelopment means prodigality and wastefulness. Overdevelopment means misers and kleptomaniacs. Right development means honest citizens and taxpayers. This instinct of acquisitiveness is natural to children and especially boys. Anyone who has ever investigated a boy's pockets is able to vouch for this statement. The problem in education is how to develop this instinct and yet control it in such a way that the individual will respect the property rights of others. One way to do is to teach the boys a productive art which will enable him to create and possess property. I will quote from an article which I have read to show the possibilities of garden work.

A boy was committed to a state reform school for stealing. The boys at this school have each a little garden spot of their own which they care for. The boy mentioned had one melon plant on which in due season appeared a single tiny green watermelon. The boy cared for this watermelon plant very tenderly. Its single melon grew responsively. One day in the fall the little gardener said, "Shall I pick my melon today?" "No," was the reply, "You better leave it one more week." The next week with faltering voice George said to his instructor, "Do you remember my watermelon?" "Yes, indeed, I do. What about it?" The little fellow with difficulty restrained the tears. "Today when I went out to work in the garden it was gone." "I am sorry. You have taken good care of the vine." "Yes," returned the boy and hesitated. "Well, what is it, George?" Hesitatingly he said, "I was just wondering if all people feel that way when things are stolen from them." I am informed that that boy has left the reform school and is leading an honest life.

Garden work will not reform all thieves. Some attention to formation, however, will make reformation less necessary.

Then there is the natural instinct for activity. Some of the things that we attribute to mischievousness in a boy's life are due to the uncontrollable desire for activity. Students of child life tell us that all normal boys invite the chase. The tick tack on the window, teasing the ragman, and many other pranks are simply an attempt to satisfy the instinct for activity. This is the account left by one of the boys of a gang: "Meet every day right after school; Medford street belongs to us. We play baseball, hoist the sail, how many miles to Barbery, go to beach, etc.,

etc. Sundays go round city, wander round streets. Other days go down to freight yards and jump freights. We snow ball Jews who come to slaughter house to get food. All of us smoke. Get lager beer Saturday nights off beer wagons, gamble with dice, shoot craps." I am quoting: "Three of the boys in this gang were in reform school before they were fifteen years old."

We no longer attempt to control such activities by "don'ts." Instincts must be developed along right lines. School gardens are a valuable means of directing the human instincts into proper channels to activity.

6. Some people are much concerned about what they call the regular work of the school. Judging school work by Plato's definition and by the root meaning of the word there are many things that may be called school work beside the three R's.

I have a definition of my own for school work. "School work is the work done in and through the school that has for its object the training and development of the body, mind, and character of children."

I think no less of the value of arithmetic and geography and English as school subjects because I believe in school gardens as a means of education.

These subjects must be taught and well taught, better taught in fact than formerly, we are told by business men. In order to teach them better there must be subject matter with which to do it.

Is it not quite as good arithmetic to compute the per cent. of income on a known investment in seeds, and fertilizer, and labor, and tools as to compute the per cent. of profit and loss on a cargo of cotton when the pupil has never seen raw cotton?

Is it not as good geography to trace the potato crop from the place of production over the highways of commerce to the points of distribution and consumption as to take an imaginary trip through the Sahara desert?

Let a boy or a girl describe his garden as a lesson in English and he will write a better composition than he will in describing the Rocky mountains, about which he knows only vaguely.

One need not think any less of the need of teaching well the

subjects that are taught within the school building. They will be better taught if superintendents, teachers and pupils are interested in practical subjects like school gardens.

7. Lastly I desire to speak of the value and need of work of this kind to interest pupils in and teach them about practical agriculture. When we consider that the population is gradually drifting from the farms to the villages and from the villages to the cities the situation becomes somewhat alarming. It is important indeed that our schools teach something of the practical things of life. A boy and a girl knows better the value of a bushel of potatoes or a peck of carrots after he has raised a garden. As I said a few moments ago I do not consider this of first importance in school garden work, but it is important nevertheless. One of the great problems of life is that of food production in sufficient quantity and our schools must help to solve life's problems if they are to be solved. I have always believed that there are many boy and girls of the cities and villages who would be happier, more contented and much greater successes in life if they could find their way to the country where they would have an opportunity to engage in the business of agriculture. We know that a great many country born and country bred boys and girls meet success in the vocations of city life. There are many in the cities who would be happy in work in agriculture. The work of the schools, even in the rural districts, too often has been such as to educate boys and girls away from the farms. Our normal schools have been engaged largely in training teachers for work in cities and villages. Very little attention has been given to the training of teachers for the rural schools. This is not the fault of the normal schools. They have merely answered the immutable law of supply and demand and the demand for trained teachers has not come from rural folk. We do not need teachers for the country of ideals different than those of city teachers. We do need, however, teachers who are familiar somewhat with rural conditions and who feel that the open country is a pretty good place in which to live, and who can make their pupils feel the same way.

We read of consumers' milk strikes. I do not own a dairy

but I know enough about up state dairy conditions to tell you that when you attack the producer you are treading on dangerous ground. It takes a long time to breed a good dairy. You can't persuade people to engage in business that does not give them a fair return on investment. As soon as the business of producing milk becomes unprofitable the farmer will dispose of his dairy. Many have already done so. The price of milk to the consumer may be too high but you will do well to ascertain whether the fault lies with the producer or elsewhere. This is somewhat of a digression but it does not seem to me to be entirely out of place in the discussion of a subject which has to do with food production.

If work in school gardens helps to teach boys and girls of the villages and cities some practical lessons in agriculture and to give them a better understanding of its problems, it, for this reason, is educational and is worth while as a part of the school program.

It has been my purpose to treat "The School Garden as a Means of True Education." Undoubtedly there are many other reasons that could be given to show that school gardening has educational value. Sufficient have been mentioned, however, to justify the statement that the work has a place in the school program.

It is only when we consider education in a proper sense and according to Plato's definition that we can understand the value of work of this kind.

The school garden is a means of education because it helps to give to the body and to the soul the perfection of which they are capable. It helps to draw out and develop the mind and the character of the boy and the girl. This must be the object of the school program; otherwise it fails of its purpose.

I like to think of the school as a great cooperative institution comparable somewhat to those institutions in business which are cooperative in their organization. The cooperative business is one in which certain persons have joined to carry on business of one kind or another with efficiency and at low operating cost. It may exist for the purpose of manufacturing cloth, or some

other article of merchandise, or for the purpose of buying and selling goods.

The persons interested are the stockholders. They select a board of directors and the board of directors in turn select a manager and the manager selects his assistants. The business converts the raw material into the finished product and disposes of it on the market. The raw material may be cotton, or potatoes, or milk, and the finished product, cloth, or starch, or butter, or cheese.

In the school the parents and school patrons are the stockholders, the board of education is the board of directors, the superintendents, principals and teachers are the manager and assistants.

There is a great difference in the raw material. In the one it is as I have described. In the other it is boys and girls.

In this institution we must have ever in mind the raw material, the boy and the girl. It is for them that the institution exists. By the harmonious cooperation of all the factors of the institution and the employment of all means of education shall we get the finished product. Not cloth, or starch, or butter, or cheese, or flour. Not anything that can be measured in dollars and cents but men and women, decent, respectable, respected, honest men and women honored in the communities in which they live because they are able to contribute a share to the world's happiness. Then and only then can we call our institution and its program a success.

You are going out as teachers of children. The teacher is a vital factor in the institution which I have just described. Your work is important and it depends on you to see that it is useful as a means of education.

RAY P. SNYDER.

A RARE PALM FROM CUBA IN THE CONSERVATORIES

Charles Wright, of New England, who became the best known collector of plants in Cuba, found in the eastern end of the island during our Civil War a palm which was subsequently named *Thrinax crinita,* now known as *Coccothrinax crinita.* His collections were sent to different institutions, and at present there is some of this original collection of the palm at Kew Gardens, near London, and at the New York Botanical Garden. Until quite recently no living specimen was known, and in fact the palm had become one of the many species lost to science.

Dr. Beccari, of Florence, perhaps the greatest modern student of the palms, writes that "the specimens upon which the species is founded consist only of leaves and portions of the fibrous net resting at the base of the petiole (leaf-stalk) and composed of very fine brown filaments. This is perhaps another of the palms growing only in the east of the island."

In 1915 Mr. John Lewis Childs offered as a loan to the Garden a palm which he said was *Thrinax crinita* from Cuba. The surprise and delight that such a rare palm was coming into our collection was very nearly matched by our incredulity that this plant of which only herbarium specimens over sixty years old were known, could come through a commercial florist and nurseryman, rather than from an elaborate exploration trip of scientific men.

But *Coccothrinax crinita* the palm undoubtedly is, and from all the fan-leaf palms of Cuba it is distinguished by the great amount of hoary filaments on the trunk which the illustration shows. Comparison with the original material of Charles Wright at the New York Botanical Garden shows that our specimen is identical with the original.

Mr. Childs has kindly turned over to us his record of how the plant came into his hands. On March 17, 1894, R. D. Hoyt, of Clearwater, Florida, found two specimens of it in an abandoned coffee plantation about twelve miles northwest of San Cristobal, Province of Pinar del Rio. It was "identified from specimens

of leaf, fibre and fruit sent by me to Kew Gardens, London." Mr. Childs secured the plant from Mr. Hoyt, and because it was getting beyond his greenhouse limits, he has deposited it at the Botanic Garden. The plant is now ten feet from the top of the tub in which it grows to the tip. It has not yet flowered although it is certainly over forty years old, and may be much more than that.

The discrepancy of Wright finding the palm "in Eastern Cuba" and the present living specimen coming from Pinar del Rio remains unexplained. It may have been transplanted or the original record may have been in error. Certainly it is the rarest of Cuban palms, and the Garden is singularly fortunate in having, for public exhibit, a plant long lost to science and interesting in itself for its splendid broad leaves and curious hairy trunk.

NORMAN TAYLOR.

RETIREMENT OF PRESIDENT HEALY

On May 13 Mr. A. Augustus Healy resigned the presidency of the Brooklyn Institute of Arts and Sciences after twenty-five years of service. On May 19 a dinner was given to Mr. Healy at the Hamilton Club, Brooklyn, by his associates on the Board of Trustees, in recognition of his long and invaluable services to the Institute. On this occasion a beautiful antique silver tray was presented to him by members of the board. Mr. Frank L. Babbott, the newly elected president of the Institute, presided and made the presentation, which was accepted by Mr. Healy with a very aptly worded response. The company was loath to adjourn, and did not do so until nearly every trustee present, and the directors of the four Departments of the Institute, had paid a brief tribute to Mr. Healy's efficient and devoted service to what he happily designated as the greatest work of his life.

At the annual meeting of the board of trustees, on May 13, Mr. Healy was elected honorary president of the Brooklyn Institute. We are happy to note that his *ex officio* membership on the Botanic Garden Governing Committee will be continued by appointment.

A JOURNAL OF ECOLOGY

Cooperation in science doubles the value of each man's knowledge and efforts. The Ecological Society of America, comprising zoologists, botanists, foresters, agricultural investigators, climatologists and geographers, is a link in the cooperative chain which will bind the natural sciences together. The society has long felt the need of having its own journal, and at its St. Louis meeting last December voted to start a serial publication to present original papers of an ecological character.

The enterprise is made possible by the generous action of the owners of *Plant World,* who are giving this magazine to the Ecological Society to continue as its official organ. The new serial will begin as an illustrated quarterly of about 200 to 300 pages per year, known as *Ecology*. The Brooklyn Botanic Garden is undertaking the publication of this journal in cooperation with the Ecological Society under an agreement substanially like that under which the *American Journal of Botany* is now being published. The *Plant World* will complete the present volume, number 22, and *Ecology* will begin with the number for January, 1920. Major Barrington Moore, now serving his second term as president of the Ecological Society, has been elected editor-in-chief. (*Science,* Feb. 13, 1920.)

VOICES OF TREES

I had an interesting conversation today with Mr. John Grimshaw Wilkinson, the blind botanist of Leeds, referred to in Professor W. H. Bragg's lecture on Sounds at the Royal Institution yesterday. Mr. Wilkinson became blind when twenty-two years of age, and he was sixty-four a few days ago. Immediately on becoming blind he took up science, particularly botany, and pursued it until he became a well-known authority.

Before his affliction he was a grocer, but had distinct artistic tastes and gifts. When he was blind he accompanied a friend into the country at Templenewsam, where three years before he

had made a sketch, and he was able to describe in detail the whole scene. By simply touching a tree he could name it. From that time he did all in his power to develop this gift, and at the present time he is able to name 800 British flowering plants, foreign trees and foreign weeds, simply by the sense of touch.

Mr. Wilkinson stated that his first observations in sound were with the variations caused by ground covered with growing crops. Later he was attracted by the manner in which trees of every description gathered water during the rain and cast it from them either inwards towards the stem or outwards. "If I feel a poppy leaf," he said, "on a hot July morning it feels cold, but if I feel a leaf of London Pride at the same time it is quite warm, although the plants may be within a yard of each other. When I touch anything I notice whether it is warm or cold, and then ask myself Why?"

Woodland Whispers

During heavy showers he discovered that trees made different noises and he could tell them by the sound from the falling rain. The most silent tree, he believed, was the *Pinus sylvestris*. These trees only made an occasional hiss even in very severe thunderstorms. The oak was the noisiest of trees in a storm, because it reflected the echoes by its leaves and also by its stem, and raindrops had a more drumlike effect upon it than upon any other tree. It was in a wood composed of oak trees that one could hear birds at their best. Among pine trees, owing to the softness of the wood, birds were not heard to the same advantage, the wood absorbing the sound, whereas the oak gave it fuller play because of its hardness. The poplar tree, being sensitive to electricity, was almost silent in a thunderstorm, and yet after the storm was over it was more noisy, because the twigs were more elastic. "I think," said Mr. Wilkinson, "that the sound of falling water is very fascinating to the ear. I have particularly marked the contrast between sound in a place where rocks are bare and in other places where they are covered with moss. This gives a kind of muffled sound to the musical splash of the water, and also to the songs of birds."

Turning again to the question of touch, Mr. Wilkinson said that it was a delight to shake hands with some people. "I know one of the finest surgeons in the City whose handshake is nervous, but who can handle the lancet with great skill," he said. "Some people judge too much by appearances. If I could go into Armley Gaol and shake hands with the prisoners I could at once tell which were habitual criminals and which were not. People who are not quite what they should be are never well balanced in action. They have some small trait in their hands or feet which gives them away."

In July, 1915, Mr. Wilkinson had the degree of M.Sc. conferred on him by Leeds University.—*London Times,* Jan. 8, 1920.

BOLSHEVISM AND HORTICULTURE

"Many who are interested in horticulture in England must have wondered more than once what has become of the Russian botanists and horticultural tourists under the Bolshevik regime. What, for instance, has become of Mdm. Olgo Fedtschenko, whose knowledge of the plants of Turkistan was probably unique, or of her son, Boris, who was in charge of the St. Petersburg Herbarium, for which a magnificent new building had just been completed before the commencement of the war? We wondered what had become of those botanists of Tiflis who were working at the flora of the Caucasus, a region which seems to be so rich in interesting plants. An article by M. Correvon, in the January number of the *Revue Horticole,* tells us that he has at last been able to obtain some information as to the fate of Russian botanists and horticulturists, because M. Kesselring, of the well-known firm of Regel and Kesselring, of Petrograd, has escaped from Russia and arrived safely in Switzerland. Dr. Regel was Director of the Petrograd Botanic Garden in the latter half of the nineteenth century, at a time when his son Albert was able to introduce into cultivation many good plants which he discovered in Turkistan. The firm of Regel and Kesselring had kept an invaluable collection of notes on these and other plants that they

have, from time to time, had in cultivation; but this collection, together with Regel's Library, though removed for safety to the Swiss Legation, has been entirely destroyed, together with all the buildings in which the firm conducted its business. The Bolsheviks have even torn up and burnt for fuel the balks of timber of which the roadways were constructed in Kesselring's nursery ground, together with all the trees and shrubs that were growing there. An even more tragic fate seems to have overtaken Julia Mlokosowitch, whose Christian name is recorded in *Primula Juliae,* which she found in the Caucasus, and whose surname will always remain attached to *Paeonia Mlokosowitchii,* which her father discovered in the Lagodeschi region (it is from this region *Gentiana lagodeschiana* was obtained) of the province of Tiflis. She has apparently been murdered by the Bolsheviks and her sister has been driven mad. M. Fomine and M. Medwedew, the well-known botanists of Tiflis, appear to have simply disappeared and nothing is known of their fate." (W. R. Dykes, in *Gardeners' Chronicle,* Feb. 14, 1920.)

NOTES

At the annual meeting of the Board of Trustees of the Brooklyn Institute of Arts and Sciences, held on May 13, 1920, Mr. Frank L. Babbott was elected President to succeed Mr. A. Augustus Healy. Mr. Babbott thus becomes *ex officio* a member of the Botanic Garden Governing Committee.

An International Physiological Congress will be held in Paris from July 16 to July 20, 1920, under the presidency of Prof. Charles Richet.

Recent callers at the Botanic Garden included Dr. Ivar Jörstad, State mycologist, Botanical Museum, Christiania, Norway (February 16); Mr. D. F. Jones, New Haven, Conn. (March 5); Mr. Michael Shapovalov, U. S. Dept. Agric. (March 11); Mr. H. S. Smith, Napier, New Zealand; Mr. J. I. Lauritzen, U. S. Dept. Agric. and Mr. F. G. Robb, Bureau of Markets, U. S.

Dept. Agric. (April 2); Prof. L. H. Pammel, Iowa State College, Ames, Iowa (May 5); and Mr. Harry A. Norton, Ayers Cliff, Prov. Quebec, Canada (June 3).

Dr. Frederick Kolpin Ravn, professor at the Royal College of Agriculture, Copenhagen, and a recent caller at the Botanic Garden, died suddenly at the home of relatives in East Orange, N. J., on May 25.

The name of the Brighton Line elevated railroad station near the Garden, formerly known as Consumers Park, has been changed to *Botanic Garden.* This station, formerly a flag station, is now a regular stop for all trains.

Miss Mathilde Bensaude, who was appointed laboratory assistant at the Botanic Garden on January 15, 1920, resigned on June 1 to return to her home in Portugal. Miss Bensaude received the degree of *Docteur es Sciences* in 1918, with Professor Matruchot.

"The Seventh Annual Flower Show opened yesterday afternoon (March 15) in the Grand Central Palace. Promptly at 2 o'clock Mrs. Woodrow Wilson lifted a telephone receiver in the White House and, by means of an electrical connection, the door swung open. The first to enter was a body of ex-service men, wounded and gassed in war, who are taking a course in gardening in the Brooklyn Botanic Garden." (New York *World,* March 16, 1920.)

Mr. John W. Frothingham and Mr. Frank Bailey have been appointed to membership on the Botanic Garden Governing Committee.

Death of Saccardo.—The director of the Garden has received from Padua, under date of February, 1920, a notice of which the following is a translation: "We regret to inform you that on the 12th of February last, former professor of botany in the Royal University of Padua, and professor emeritus in the same, commander of the order of *SS. Maurizio e Lazzaro,* and of the *Corona d'Italia,* member of numerous academies and scientific

societies, both Italian and foreign, Prof. Dr. Pier Andrea Saccardo, passed away serenely in Padua in his 74th year, after a life devoted even to his last days to the progress of botanical science and of mycology, to his family and to his country."

Bees in a Botanic Garden.—We learn from the *Quarterly Summary* of the Royal Botanic Society of London, for July, 1919, that a hive of bees was installed in the Students' Garden in 1918 in connection with the Fellows' Children's Outdoor School, and a second hive was added in the spring of 1919. The report states that "Apart from its educational value the visit of the bees has resulted in a great improvement in the amount of seed produced by plants in the Gardens." In this connection it may be stated that a hive of bees was placed in the Brooklyn Botanic Garden on June 1, 1919. There has been no evidence in the Botanic Garden that the presence of these bees has produced any effect on the amount of seed produced by the plants in the Garden.

The Botanic Garden library has just received the initial number of a new garden magazine entitled *Gartenschönheit, eine Zeitschrift mit Bildern für Garten- und Blumenfreund. für Liebhaber und Fachmann.* The first number appeared in April, 1920, published in Berlin, Germany. The large size of the pages (10" x 14") affords opportunity for the numerous half tone and colored illustrations of plant life and gardens. The annual subscription price in Germany is twelve Marks. The editor-in-chief is Oskar Kühl, in association with Karl Foerster, Harry Maas and Camillo Schneider.

Mycological Notes, No. 61, dated October, 1919, edited and published by C. G. Lloyd, was received at the Botanic Garden Library last March in mimeographed form. The introductory paragraph reads as follows: "The appearance of this publication in mimeographed form is due to the High Cost of Printing. In order to meet the arbitrary and unreasonable demands of organized labor the price of printing has advanced until it has become prohibitive for a publication of this kind. In future we shall therefore issue as mimeographed sheets at about one quarter the

cost and in a manner more effective and convenient than to bother with printers. The illustrations will be printed as plates and sixteen plates will accompany each number of the publication."

The *Nature Study Review* for March, 1920, was a "School Garden Number." The leading article was by Miss Shaw of the Botanic Garden staff on "Efficiency Aids to Garden Work." Examples of work with children at the Brooklyn Botanic Garden were used to illustrate the general principles and statements made in the article which was illustrated with half-tones of indoor and outdoor work with children at the Brooklyn Botanic Garden. Mrs. Anna Parfitt Barton, a graduate of our Teachers' Training Course of the class of 1914, also had an article on the "Bag Worm Drive."

Save the Redwoods League, "organized to preserve the oldest trees in the world" aims to bring into unity of action all interests concerned with the movement to preserve such portions of the Redwood forests as should be saved to represent their fullest beauty and grandeur. The plans of the League involve: (1) The securing of a belt of the finest redwood timber bordering the northern highway, in the hope that this area may become a state park. (2) The obtaining of a considerable body of the most typical primitive redwood forest known, for the purposes of a National Redwood Park. The annual membership fee is $2.00. The President of the League is Mr. Franklin K. Lane. Information concerning membership may be had from Mr. Robert P. Sproul, Secretary-Treasurer, 430 Library, University of California, Berkeley, Calif.

The New Era Printing Company, which has printed the Brooklyn Botanic Garden Record since 1914, and other peridoicals published by the Brooklyn Botanic Garden, has recently been reorganized. The old firm has sold out its entire interests in The New Era Printing Company to be succeeded by The New Era Printing Company, Inc. We regret that this change includes the retirement of Mr. Andrew H. Hershey, who for more than fifty years has been actively engaged in the printing business,

from apprentice to proprietor. A long and most pleasant business connection is hereby terminated so far as Mr. Hershey and his associates are concerned. It is a pleasure to record here the uniform courtesy on their behalf and the satisfactory service which has always attended our relations with the retiring proprietors, and it is a pleasure to express in this public manner our best wishes and felicitation to Mr. Hershey and his associates, Mr. Schindle and Mr. Warfel, as well as our best wishes for the new proprietors who have, we are glad to say, been actively identified with The New Era Printing Company for some time past.

Plans of the Royal Botanic Society.—The *Quarterly Summary* of the Royal Botanic Society of London, No. 2, for October, 1919, contains a report of a committee of eight appointed on April 9, 1919, by the Right Hon. Lord Ernle, M.V.O., president of the Board of Agriculture and Fisheries, "to inquire and report what steps should be taken to render the work of the Royal Botanic Society of London as useful as possible from the scientific and botanical point of view." The chairman of the Committee was Lieut.-Col. Sir David Prain, Director of the Royal Botanic Gardens, Kew. The objects of the Society, as set forth in the charter, are "the promotion of Botany and its application to Medicine, Arts and Manufactures, and also for the formation of extensive botanical and ornamental gardens within the immediate vicinity of the Metropolis." The scientific aims of the founders and the Society subsequently were rather to provide material for teaching and research than to develop the Gardens as a teaching center. This has been the policy from the commencement, and it has also been the wish of the Society to provide information and economic and medicinal material to those engaged in the investigation or utilization of plant products. Although the Society did not at first consider it within its province to institute courses in botany, in 1897 it started a gardening school with a view to meet the want for scientifically trained gardeners. While it did not contemplate that research work should be carried on, it has on many occasions provided facilities for experimental work in botany and horticulture.

From considering various proposals and suggestions put before them by English botanists and authors the committee "have formed the opinion that the Royal Botanic Society could be made more useful both from the scientific and educational point of view by the establishment of

(1) A School of Economic Botany, at which a knowledge of the economic plants and their products, including those of tropical regions, might be obtained.

(2) An Institute which might be made a center for research, more especially in Plant Physiology, where the living plant is essential.

(3) A center for teaching in Horticulture, the students of which could receive their necessary training in pure science at existing London Colleges.

(4) Courses in "School Gardening" at times suitable for teachers in elementary, continuation and other schools.

It is recommended that buildings "of a temporary nature and of not more than two stories" be erected near the present greenhouses to contain:

(1) A fair-sized Laboratory for General Research work.

(2) A Laboratory fitted for Research in Physiological Botany.

(3) Various smaller rooms to be used for independent workers. (For these a reasonable charge might be made or arrangements made for them to be subsidized by organizations, other than the Society, who would nominate workers.)

(4) Private Laboratories for Members of the Staff.

(5) Directors office, Horticultural Instructor's room, Laboratories, etc.

(6) Balance room, general storeroom, chemical storeroom.

(7) At least two other rooms for eventualities.

Suggestions are also made for the organization of a staff to carry on the new work.

News Items from the National Research Council.—The Carnegie Corporation of New York announced last January its purpose to give $5,000,000 for the use of the National Academy of Sciences and the National Research Council. A portion of the

money will be used to erect in Washington a home of suitable architectural dignity for the two beneficiary organizations. The remainder will be placed in the hands of the Academy, which enjoys a federal charter, to be used as a permanent endowment for the National Research Council. This impressive gift is a fitting supplement to Mr. Carnegie's great contributions to science and industry. Other gifts have been made to the Council for the carrying out of specific scientific researches under its direction.

The Council is a democratic organization based upon some forty of the great scientific and engineering societies of the country, which elect delegates to its constituent Divisions. It is not supported or controlled by the government, differing in this respect from other similar organizations established since the beginning of the war in England, Italy, Japan, Canada, and Australia.

The Council was organized in 1916 as a measure of national preparedness, and its efforts during the war were mostly confined to assisting the government in the solution of pressing war-time problems involving scientific investigation. Reorganized since the war on a peace-time footing, it is now attempting to stimulate and promote scientific research in agriculture, medicine, and industry, and in every field of pure science. The war afforded a convincing demonstration of the dependence of modern nations upon scientific achievement, and nothing is more certain than that the United States will ultimately fall behind in its competition with the other great peoples of the world unless there be persistent and energetic effort expended to foster scientific discovery. The Council was reorganized in 1918, by an executive order of the President, on a permanent peace-time basis.

At the suggestion of Mr. Herbert L. Bridgman, member of the Board of Regents of the State of New York, the library of the Botanic Garden has been presented with a copy of the "Wild Flowers of New York," Part I, by the state botanist, Homer D. House. The book comprises 143 colored plates accompanied by

descriptions of the plants illustrated. This particular copy bears on the flyleaf the following inscription under date of June 16, 1920:

"To the Children of the Garden:

These are the Flowers of the Great Garden—your Imperial State of New York. They are all trying to look their prettiest for they are asking you to be their Friends at Home and their Companions when they meet you in the Woods and Meadows or along the Roadsides.

JOHN M. CLARKE,
Director."

At the fiftieth commencement exercises of Syracuse University on June 14, 1920, the honorary degree of Doctor of Science was conferred on the following: Dean E. H. Kraus, University of Michigan; Professor Charles G. Rogers, Oberlin College; Director C. Stuart Gager, Brooklyn Botanic Garden; Professor Charles B. Cooper, College of Journalism, Columbia University.

BROOKLYN BOTANIC GARDEN RECORD

EDITED BY

C. STUART GAGER

VOLUME IX

1920

PUBLISHED QUARTERLY
AT 41 NORTH QUEEN STREET
LANCASTER, PA.

BY THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

PRESS OF
THE NEW ERA PRINTING COMPANY
LANCASTER, PA.

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ERRATA

Pages 4 and 5 are transposed.

Page 24, line 20, for "*Gorden*" read "*Garden.*"

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

RECORD

VOL. IX October, 1920 No. 4

IRISES FROM JAPAN

When we speak of Japan and irises in the same breath we refer to the big Japanese irises that in late June or early July give masses of color in our gardens, the type of plant and flower that we so often see used in Japanese decorative art, and yet other irises are natives of Japan though curiously enough they all have flowers of similar character.

The genus *Iris* belongs to the Monocotyledons. The newly sprouted seedlings are barely distinguishable from the grasses, but with age the foliage broadens out in most of the species, the roots become bulbous or rhizomatous forming, in the latter case, dense mats almost on the surface of the ground. This forms the first mark of division between various irises, and the second is drawn from the presence or absence of a beard upon the larger segments of the three-partite flower. In the fleur-de-lis* of the old-time gardens the beard is conspicuous with its yellow or orange tones, in the crested irises, there is merely a rudimentary ridge, colored to be sure, but with no hirsute developments, and in the beardless irises of which our native flag is an example,

* The name "fleur-de-lis" seems to have been first applied to the yellow iris that grows along the banks of the river Lys, in Flanders. The Franks, who invaded and conquered Gaul and established the Kingdom of France, in 468, adopted the flower of the Lys, "*fleur de la rivière de la Lys,*" or, more briefly, "*fleur de Lys,*" as their emblem. The name was anglicized as "Flower de Luce." (*Rhodora* 21: 180–181. 1919.)—*Ed.*

there is no suggestion of either crest or beard save in color. I have already said that the flower was made up of threes, three "falls" as they are called, usually the most conspicuous of the petals and often somewhat drooping, then three "standards," typically erect, but in the beardless sometimes held almost on the same plane as the falls. Still less noticeable are the style-branches which overarch the falls and protect the stamens. Only in the double Japanese irises do we find falls and standards and style-branches developed almost beyond recognition into great broad showy petals, that spread horizontally.

Before mentioning in greater detail these big brethren, I wish to call attention to three of the crested irises from Japan, *I. gracilipes, I. tectorum,* and *I. japonica. Iris gracilipes,* with its neat grassy tufts of foliage and small flowers in miniature of the large ones, is one of the most dainty of irises. In northern Japan you will find it on cool, wooded slopes, but it is thriving on a well-drained, slightly shaded bank in my rock garden. The flowers carried on slender branching stalks are pink-lilac, with a tracery of deeper lilac upon the falls. In outline, in growth, even in the markings of the petals, the plant is most decorative and, treated as a pot plant, is a picture in itself. *I. tectorum,* the roof iris, is coarser throughout with lush spreading fans of bright yellow-green foliage that is often touched by our spring frosts. The type is blue-purple and rather dull, even with its prominent crest of white, but the variety *alba,* in purest white, is most charming, and both come true from seed. They are well suited to the ordinary garden though it is desirable to reset the plants every few years as the short feeding roots soon exhaust the soil. Still larger is *I. japonica* with its handsome, bold foliage, but frosts so injure it that we, in the north, must grow it in a cool house. The flowers, though evanescent, are borne in great profusion, and the tints of mauve and lilac, white and gold have a great fascination.

These three are of the crested irises, but with *I. laevigata,* which has been much used as a trade name for *Kaempferi,* we come to the *Apogons.* In Japan, when given rich soil on the shores of a pond, this iris bids fair to rival the yellow English flag, *I. pseudacorus,* in growth and stature, and its good-sized

flowers are of the richest, truest blue to be found among the irises. Unfortunately it is rarely listed, nor is the much less effective blotched variety, *I. albopurpurea,* and we must be satisfied with the garden varieties of *Kaempferi,* which come in a wide range of color and form.

These have been developed probably slowly through centuries of selection in China and Japan to their present size, but did not flower in Europe until Siebold's importation became established at Ghent in 1857. Almost immediately, however, Japanese irises won popularity, were imported in large quantities, sometimes under Japanese names, more often in mixture, and during the sixties and seventies we find firms listing them in great variety. Unfortunately many firms used names to suit themselves and the practise has continued to a certain extent up to the present day with a consequent confusion in nomenclature. It is in an attempt to straighten out this confusion that The American Iris Society is fostering a trial collection at the Brooklyn Botanic Garden.* At least five hundred names have been used in the catalogs; probably one hundred and fifty would easily cover the distinct varieties now in cultivation, and the task ahead is no sinecure.

The Japanese irises of our gardens have reached a higher state of development than any of their kin; we may have them single or so double that even the style-branches seem to have been metamorphosed into broad spreading falls, and from the red purple of the type the range of colors has been widely extended though in none is there a vestige of yellow as a body color. The pure white Gold Bound is quite commonly listed, some are of solid red or blue purple in varying shades and tints, some are flecked with white or light tones upon the darker ground while others are suffused or veined, or splotched with the darker hues. All have a heavy substance, one seems actually to feel the thickness of the petals, but some are waxy or show a silky sheen on the surface, and the smooth carriage of the segments may be modified by a broad waving or even a sort of crimping or ruffling. The colors are rarely alive, as an artist might state it, but the expanse of color gives great garden value. We hear tales of individual blooms a foot or more across, and when one realizes that the

* *Cf.* pp. 00–00, and 00, *infra.*

flowers are carried above the sword-shaped leaves practically in one plane, it is perhaps possible to picture what a sheet of color a field of these irises may present.

But let us leave the flower itself and see how we can use the plant in the garden and under what conditions it will thrive. The beardless irises all appreciate moisture, particularly through the flowering season. In a cold climate they will not endure submergence during the winter, but a few inches of standing or flowing water, before, during and for a short spell after the blossoming time, is well worth planning for, especially in the case of the Japanese. In Japan it is so planned, the edges of the beds being often protected by a woven wattle of bamboo, and between the floodings rich manure is well worked into the soil. Fortunately we can grow them in our gardens with but a tithe of such care, but it is well to keep in mind their preferences and give them moisture and food at least. As to transplanting, either immediately after the blossom fades or before growth starts in the spring is recommended.

In the garden proper I like to use these irises with some consideration of their fine foliage throughout the season. The bold uprightness of their leaves, their depth of green, and density of growth all merit careful placing. Just as a peony plant, or a line of peonies, may be used as an accent or as a backbone to a garden bed, so may a thriving iris plant be used to even greater advantage as its verticality gives an added meaning to the composition. In time of bloom these irises conflict with the Delphiniums and I must confess that I do not like a haphazard combination of their hues. Some Delphiniums go well with some of the iris colors, but their close affinity in the spectrum calls for a nice discrimination. In a way, their very size and solidity of color are not adapted to a happy color scheme, for it must be a peculiarly loud perennial that will be noted in the same glance. The contrast in growth of irises and astilbes is most pleasing; as a foil for montbretias and gladioli they are ideal; the graceful Japanese anemones have such similar cultural tastes that they may be used to advantage for succession; the late blooming *Hemerocallis luteola pallens* suggests a yellow touch and even the common *Coreopsis* might have a place in the design. Such suggestions

are, however, for the individual gardener to work out; my garden is poor and dry, and the Japanese irises find a position that they like in a moist spot by the pond. There I carry on a judicious form of naturalizing. In early spring there are edgings of primulas, violas, and for-get-me-nots; Siberian irises carry along the bloom, and when the Japs have gone nature holds full sway. It becomes a tangle of the wild things, Joe-Pye-Weed, asters, golden-rod, and *Eupatorium* fight together, and at the very water's edge are the white spikes of arrowhead and the red of cardinal flowers. Such is my site for Japanese irises, but I should like a more watery place with quiet pools, winding sluggish channels, perhaps a bit of cascade, and all so constructed that I might flood the beds at will and walk upon high paths or moon-arched bridges from which to overlook it all. How one can dream in and about gardens!

I have purposely refrained from a recommendation of named varieties; almost every catalog offers a different selection and fundamentally color is a matter of personal taste. You will find here no such variation of good, bad, and indifferent as is the case among the bearded irises. Unless you are working out a particular scheme in your garden proper, use them in masses at the edge of the wild, and paint broadly, with but a few colors upon your palette.

If you are not familiar with these irises and their possibilities you may add a wealth of color to your garden for late June or early July, and we hope that in years to come the Brooklyn Botanic Garden will show them to you at their best. It should prove a Mecca for flower lovers, particularly at this season.

Robert S. Sturtevant.

ARTICLES OF AGREEMENT BETWEEN THE AMERICAN IRIS SOCIETY AND THE BROOKLYN BOTANIC GARDEN

The American Iris Society, hereinafter called the Society, and The Brooklyn Botanic Garden, hereinafter called the Garden, hereby agree to cooperate for the purpose of establishing a collection of Japanese irises and for the study of their cultivation,

nomenclature, classification, and comparative merit, and for such other matters as may be hereafter agreed upon.

This agreement is to extend over a period of five years, extending from 1920 to 1924 inclusive, and may be terminated upon one year's notice by either party or extended by mutual agreement.

The Garden agrees as follows:

1. To provide land within its own grounds, labor of planting and proper care and maintenance.

2. That all records relating to the subjects of study, excluding notes of a strictly preliminary nature, shall be kept in duplicate and one copy supplied to the Society for use and preservation.

3. That any standards (of classification, methods of recording, etc.) which may be accepted by the Society shall be used when pertinent or applicable, and that nothing tending to establish a standard in respect to *Iris* shall be published without the previous approval and consent of the Society or its Board of Directors.

4. That data secured from this collection shall be open to the use of the Society and that any Bulletins thereon published by the Garden shall be furnished to the Society in number equal to twice the amount of the then membership.

5. That stock of irises furnished by the Society or stock resulting from its increase shall not be disposed of by sale or exchange except with the approval of the Board of Directors of the Society.

The Society agrees as follows:

1. To furnish without charge the necessary stock that can be secured through the contributions of its members or from interested growers. Three plants constitute a test, one or two may be provided.

2. To cooperate fully in the collecting of data.

3. That the Garden may be required to act contrary to this agreement, since it occupies City property and derives income from city funds.

It is mutually understood by both parties:

1. That either party may publish such data as has been gathered, but that incomplete data may not be released for publication except by special consent of both parties.

2. That at the close of this agreement or at any previous time agreed upon the stock or portions thereof shall be divided as follows; to the Garden three plants each of all distinct varieties; to the contributor, subject to his expressed wish, plants equal to his original contribution, if available; to the Garden and the Society, equal portions of all remaining stock.

3. That all claims to damages due to non-fulfillment of this agreement are waived.

4. That the essence of this agreement is the development, maintenance, and study of a beautiful, complete and valuable collection of Japanese irises, and the utilization of it in such manner as to promote the aims and objects of the Society and the Garden jointly.

For the Society
(Signed) John C. Wister,
President
(Signed) R. S. Sturtevant,
Secretary, April 20, 1920

For the Botanic Garden
(Signed) C. Stuart Gager,
Director
April 19, 1920

EFFECTS OF THE WINTER OF 1919–1920 ON THE WOODY PLANTS IN THE GARDEN

While the winter of two years ago had several days when the temperature was lower than ever before recorded here, the past winter was more continuously cold than any other for thirty years. The notes on the effects of the past winter are, therefore, a record not so much of what one unprecedented period of low temperature will do, but rather the cumulative effect of two exceptionally bad winters, with only a single mild one intervening—that of 1918–1919.

Taking first of all those killed outright, the following woody species have been lost to our collections:

Winter Killed

Picea obovata, P. sitchensis (except snow protected specimens), *P. Alcockiana, P. orientalis, P. morinda; Abies cilicica,*

A. arizonica; Pinus resinosa, P. rigensis; Chamaecyparis obtusa, C. obtusa nana; Berberis Wilsonae, Cocculus (Wilson No. 617), *Ribes intermedia, Rosa sericea var.* (Wilson No. 4118), *Spiraea Henryi, S. Henryi notabilis, S. Henryi Veitchii, Ilex pedunculosa, Buxus sempervirens, Vitis betulifolia, Acer colchicium, A. Negundo; Tamarix japonica plumosa, T. chinense, T. Odessana; Lonicera Henryi, L. deflexicalyx; Diervilla sessilifolia* (two adjoining specimens untouched), *Syringa pinnatifolia, Erica stricta.*

Many other specimens, while not killed outright, were very severely winter-killed, often killed to the ground but with the roots still alive. All such, now (August) showing good recovery, are here put in the category of:

Severely Winter-killed, but Recovering

Cryptomeria japonica, C. japonica Lobbii; Juniperus chinensis prostrata, J. virginiana; Sciadopytis verticillata, Taxus baccata aurea, T. cuspidata hibernica; Chamaecyparis nutkatensis glauca, C. nutkatensis glauca pendula, C. obtusa compacta; Pieca omorika, P. nigra, P. polita, P. Veitchii, P. Abies dumosa, P. pungeus, P. pungeus kosteri, P. concolor; Abies nobilis glauca, A. Nordmanniana (specimen will hardly recover); *Berberis Wilsonae, B. Poiretii weichangensis, Berberis sp.* (Wilson No. 1216); *Mahonia Aquifolium, Deutzia longifolia, D. parviflora; Philadelphus Wilsonae, P. sericanthus Rehderianus, P. californicus; Ribes robustum, R. odoratum, R. Gordonianum, R. grossularia uva-crispa; Parrotia persica* (nearly dead), *Corylopsis pauciflora, Spiraea Billardii, S. cantonensis, S. molliaefolia; Cercis chinensis* (two adjoining specimens untouched), *Ilex Fargesii, I. Aquifolium, Buxus sempervirens, Ampelopsis aconitifolia, Tamarix gallica, T. indica, T. germanica; Jasminum nudiflorum, Fontanesia Fortunei, Phillyraea angustifolia, Ligustrum brachystachium, L. amurense; Buddleia intermedia, B. japonica, B. nivea yunanensis, B. curvipes, B. variabilis Wilsoni, B. variabilis superba; Catalpa Bungei, Lycium halimifolium, Halesia diptera, Lonicera Regeliana, L. Thibetica, L. involucrata; Diervilla rivularis, D. sessilifolia.*

It will be noted that some of the plants listed in the foregoing

occur both among those killed outright and among the severely winter-killed. This indicates individual differences.

There are still other plants in the collections where the evidences of the past winter are now wholly obscured by the fact that the injury was slight and the vigorous growth of this season has repaired the damage. They are listed here as plants only slightly winter-killed at Brooklyn.

Slightly Winter-killed

Pinus koraiensis, Picea excelsa, P. pungens glauca; Celtis australis, Celtis sp. (Wilson No. 343); *Berberis aristata, B. sinensis, B. canadensis, B. aggregata Poiretii, B. Julianae, Calycanthus occidentalis, C. fertilis; Philadelphus Lewisii, Philadelphus sp.* (Purdom No. 818); *Ribes virguum, Eucommia ulmoides* (adjoining specimen untouched), *Exochorda racemosa, Rosa gallica centifolia, Rosa sp.* (Purdom No. 635), *Rosa rubrifolia; Spiraea Henryi, S. concinna, S. Bumalda Anthony Waterer, S. Margaretae, Ilex Sieboldii, Euonymus nana, Acer palmatum ornatum, Halesia carolina, Lycium chinense, Vitex Agnus-castus, Ligustrum media, Symphoricarpos occidentalis, Viburnum theiforum, V. betulifolium.*

In the Record for July, 1918, was recorded the loss from the winter preceding that, and from that note we take the following tabulation, adding the records of loss for the winter just past.

Summary of Effects on Species and Varieties of Woody Plants of the Winters of 1917–18, and 1919–20

	1917–18	1919–20
Killed outright	28	31
Severely winter-killed but recovering	90	65
Slightly winter-killed	28	34

Further reference to the former article should be made for the effects of the two winters on identical species, the variations of which are not easily explainable. Undoubtedly some of our recent loss is due to the inability of many plants to recover from the 1917–18 winter. Although their obvious response to it seemed favorable, it is quite likely that they were so weakened that the 1919–20 winter proved too much for them.

Norman Taylor.

NOTES

We learn from *Science* that it is proposed by the Swedish Linnean Society to restore the old botanic garden at Upsala, together with the house in it, the former residence of Carl von Linné.

Twenty-five students of the junior class of the Library School of the N. Y. Public Library visited the Garden library on September 24, 1920, accompanied by Miss Edith W. Tiemann, registrar of the school. The librarian gave an informal talk on the methods used in the organization of the library, and answered questions regarding the work brought forth by an inspection of various catalogues and files. Tea was served in the exhibit room, after which the class was shown over the grounds by Dr. Gundersen.

Mr. Montague Free, horticulturist and head gardener, acted as judge of fruits and vegetables at the annual exhibit of the Phillipstown Garden Club, Cold Spring-on-Hudson, on September 23, 1920.

At the annual convention of the National Association of Gardeners held in St. Louis September 14–16, 1920, Mr. Free gave an illustrated lecture on "Rock Gardens" on the evening of the fourteenth.

On June 26, 1920, Mr. Charles Drechsler, of the Bureau of Markets, U. S. Department of Agriculture, entered upon his duties as successor to Mr. E. D. Eddy, in charge of the investigations of the Bureau which are being carried on at the Botanic Garden in cooperation with the Bureau. The main subjects of investigation are transit and storage diseases of fruits and vegetables.

Mr. William B. Brierley, head of the Department of Mycology of the new Institute of Plant Pathology, Rothamsted Experiment Station, England, spent a half day at the Garden on July 28, inspecting our laboratories and other equipment and collections. Mr. Brierley is making an official tour of inspection of various

botanical institutions of the United States in connection with the projected enlargement of the plant disease work at Rothamsted.

Mr. Charles F. Hills, secretary of the Chicago Academy of Sciences, visited the Garden on July 20. The authorities of the museum of the Academy are contemplating an expansion of its work along certain lines, and Mr. Hills is visiting various museums and botanic gardens in the East in order to learn at first hand of their scope, methods, and equipment.

In response to a request from the New York City Board of Health, the Botanic Garden, in July, supplied specially prepared mounted specimens of poison ivy (with five-fingered ivy), ragweed (*Ambrosia trifida*), and jimson weed (*Datura stramonium*) to be used in the popular educational work of the Board concerning these poisonous weeds.

Visitors to the Botanic Garden since the last issue of the RECORD include Mr. H. Guthrie Smith, Napier, New Zealand (April 2), Dr. J. I. Lauritzen and Dr. F. G. Robb, Bureau of Markets, Washington, D. C. (April 22), Prof. L. H. Pammel, Iowa State College, Ames, Iowa (May 5), Mr. Harry A. Norton, who has one of the largest collections of Lilacs in Canada, at Ayers Cliff, Prov. Quebec (June 3), Dr. F. Lamson Scribner, Washington, D. C. (June 12), Mr. John C. Wister, Philadelphia, president of the American Iris Society (July 16), Mr. W. M. Mann, U. S. Dept. Agr., Washington (July 17), Dr. Adolph J. A. Friedholm, professor of plant pathology, University of Porto Rico, Mayaguez (July 23), and Dr. C. V. Piper, U. S. Dept. Agr., Dr. Arthur Hollick, U. S. Geol. Survey, Washington, D. C. (Aug. 9), Prof. Yoshinari Kuwada, Imperial University, Kyoto, Japan, Mr. Eskichi Iso, Formosa, and Prof. E. M. East, Harvard University.

Swans as scavengers.—A pair of swans, to replace those which escaped during the war, has been presented by the Lord Chamberlain to the Royal Botanic Society of London. These are not merely for ornamental purposes, writes a London *Daily Chronicle*

representative, but are to be employed on useful work in demolishing the water weeds which have accumulated in the Society's lake in their gardens at Regent's Park. The absence of the swans resulted in the lake being overrun with water weeds, brought here, it was believed, by a heron which periodically visited the water for fishing purposes. "Every day the swans may be seen busy upon the duckweed," J. L. North (Curator) pointed out, "and already the water is becoming clearer." (*Newspaper Note.*)

Mr. Robert Cushman Murphy, of the Museum staff, has recently returned from the islands off the coast of Peru. While most of his material is zoological, he collected all the flowering plants that could be found on the islands. Some of these small rocky islets are absolute deserts, a few with only lichens and mosses, others with as many as 15 species of flowering plants. One island contains a fringe of a single beach species along the coast, then for 1000 feet in elevation nothing but bare rock and soil, and finally a single specimen of an acacia-like tree, not over three feet high. The specimens from these unique islands have been presented to the Garden and are now being studied with a view to their identification. No botanist has ever been on some of the islands, and nearly all of the collections appear to be of very rare or unknown species of plants. Some of them may be new to science, and they form a valuable addition to the Garden's herbarium.

Water Lily Pools.—During the early part of July the water lily pools at the Conservatory Court, after having been filled for test purposes, were planted. The northern pool contains aquatics which need some heat even in the summer time, and in this pool the following species were planted:

Victoria Cruziana
Nymphaea William Becker
Nymphaea Sturtevantii
Nymphaea zanzibariensis
Nymphaea Mrs. C. W. Ward
Nymphaea pennsylvania
Nymphaea Daubeniana
Nymphaea panama pacific
Nymphaea Mrs. Woodrow Wilson.

The victoria, owing to the exceedingly cool summer, did not flower nor did it produce the tremendous leaves which that species usually has. Most of the other water lilies, however, flowered and made a very good showing. The south pool is devoted entirely to hardy water lilies and contains the following Nymphaeas: *Alba candidissima, James Brydon, Marliacea chromatella, Marliacea albida, Laydekeri purpurea, Sioux, Tuberosa rosea, odorata, Marliacea chromatella, Marliacea carnea, Gladstoniana, Marliacea rosea, Album grandiflorum, luteum.*

Toronto Botanic Garden.—Plans are being developed for the establishment of a botanic garden at Toronto, Canada, by the University of Toronto in cooperation with the municipal authorities and the Provincial Government. A special grant has been voted by the Board of Governors of the University. Mr. Alexander Simpson, representing the Toronto institution, visited the Brooklyn Botanic Garden last March on a tour of inspection of various botanic gardens of the States in order to learn of their organization and work.

A Plant Protection Institute.—With the advice and assistance of the National Research Council, a cooperative body of scientific experts on injurious insects and plant diseases and of manufacturers of insecticides, fungicides and general chemicals and apparatus used in fighting the enemies of field and orchard crops, has just been organized under the name of the Plant Protection Institute. The purpose of the institute is to promote the general welfare by supporting and directing scientific research on the pests of crops, shade trees, and ornamental plants, and on the methods of their control, and by furthering cooperation between the scientific investigators and the manufacturers of chemicals and appliances, especially for the sake of effecting standardization and economy in the production and use of the means of fighting pests. Also it expects to aid in the dissemination of scientifically correct information regarding the control of injurious insects and plant diseases. Much excellent work along this line is now being done by government and state organizations,

but a further advance can be made by introducing a wider coordination and cooperation of the efforts of both the scientific men and the manufacturers of control devices. It is in this general direction of cooperative work that the Plant Protection Institute expects to be most active. (*News item from the National Research Council.*)

Conference on Fruit Diseases.—About sixty-five American plant pathologists together with Dr. W. B. Brierly, Rothamsted Experimental Station, England; Dr. Et. Foëx, Station de Pathologie Végétale, Paris; Dr. G. Rosatti, representing Italy; and Dr. K. Nakata, Japan, assembled at Staunton, Virginia, August 3–9, 1920, and travelled up the Shenandoah Valley by automobile on an inspection tour and conference on fruit diseases arranged by the Advisory Board of American Plant Pathologists, together with F. D. Fromme, Va., C. E. Temple, Md., N. J. Giddings, W. Va., and C. R. Orton, Pa.

The principal points of interest were: spraying and dusting experiments with apples and peaches, being carried on by the Virginia Experiment Station; similar experiments by the West Virginia and Maryland and Pennsylvania stations; inspection of the experimental packing plant at Inwood, West Virginia. Evening meetings with the local fruit growers were held in each state, at which time local problems were discussed. At the Hagerstown, Maryland, meeting the foreign guests of the party gave interesting accounts of the corresponding pathological problems in their respective countries. The party also made a tour of the historic battlefields of Antietam and Gettysburg. From Gettysburg a few of the party took an additional day to inspect the cooperative experiments on tobacco being conducted by the U. S. Department of Agriculture and the Pennsylvania Agricultural Experiment Station at Ephrata, Pennsylvania. Much enthusiasm was manifested by all present, who were unanimous in declaring the trip a pronounced success. Similar trips are to be arranged for future years. The following states were represented: New York, Pennsylvania, Connecticut, Massachusetts, Delaware, Virginia, West Virginia, Maryland, Illinois, Michigan, Wisconsin,

Ohio, Oregon, Washington, D. C., New Jersey and Indiana. Among those who attended the conference were Dr. E. D. Ball, Assistant Secretary of Agriculture, Washington, D. C., and Dr. W. A. Taylor, Chief of the Bureau of Plant Industry, Washington. At Ephrata, Pa., the experiments in progress on the resistance of strains of tobacco to *Thielavia* root-rot were of special interest to the party.

The American Iris Society was organized on January 29, 1920, at the Museum Building of the New York Botanical Garden. Among the various objects and activities contemplated by the Society the following were announced in the circular announcing the organization meeting:

1. Compilation of a list of horticultural varieties, with their parentage, synonyms, originators, and dates of introduction.
2. A study of the proper classification of Iris.
3. History of Iris cultivation and of prominent Iris breeders.
4. Compilation of cultural directions for various species and various climates.
5. Research on Iris pests and diseases.
6. Establishment of a Test Garden and of Exhibition Gardens in various sections of the country.
7. Promotion of Iris exhibitions, and of the display of Iris at flower shows.
8. Commending varieties of merit; encouraging the production of new varieties of real quality, and discouraging the introduction of inferior forms.
9. Promotion of popular interest in iris, through published articles, bulletins, photographs, lantern slides, and lectures.

The *Agreement* between the Society and the Brookyln Botanic Garden concerning test and show gardens for Japanese irises is printed on pages 00–00 of this issue. Mr. John C. Wister, of Philadelphia, is the first president of the Society, and the secretary is Mr. R. S. Sturtevant, who prepared the articles on "Irises from Japan," on pages 00–00 of this issue of the RECORD. The first annual show of the Eastern Region was held at University Hall, Wanamaker Store, Philadelphia, on June 1 and 2. The exhibit will be held in a different city each year.

Presentation of Prizes.—On Saturday morning, September 25, the Boys' and Girls' Club met in the Auditorium of the Laboratory building, Lillian Baker, vice-president, presiding. The program was as follows:

Presentation of aeroplanes by William Gerrish, the maker and a member of the Club, to three boys in the 1920 outdoor garden, for neatness and excellence in garden work in our own children's garden. Presentation of War Stamps to the value of $25 for excellence of notebooks on outdoor gardening to two girls and one boy in the 1920 garden; and presentation of Thrift Stamps to the value of $50 to ten girls and ten boys for helpfulness in our Children's garden. These presentations were made on behalf of the Botanic Garden by Mr. Alfred T. White, Chairman of the Governing Committee, who has made it possible for the Garden to offer these and other prizes during the past three or four years.

A book was presented by the Flatbush Garden League through Miss Hollis, the Secretary, to Edna Whitmarsh for marked improvement in garden work, and a silver medal to Miss Hammond, of the 1920 garden teachers class, by Dr. Gager. This medal is presented annually to one member of the garden teachers class for unusual work at the Brooklyn Botanic Garden. The graduate's cup "for faithfulness and long service," was presented by Miss Sweeton to Gus Magnusson, of the 1920 garden. The Alfred T. White scholarship of $100 was presented, for the first time, by Mr. White to Harold Uhrbrock for exceptional ability in garden work. The conditions of this scholarship are as follows. Three years work at the Brooklyn Botanic Garden; satisfactory record in high school; expectation of entering some line of botanical work in the future. This is the first year of its presentation.

On Saturday afternoon, October 2, prizes and medals were presented to the winners of the children's garden contest for 1920, and also to the boys and girls of the Brooklyn Botanic Garden who had done excellent work in the outdoor garden. The first prize in Class A, School Display, a trophy, was won by P. S. 89. A silver cup, first prize in Class B, Community Garden Display, was won by McCarren Park Garden, while the

bronze statue of Victory, the first prize for Box Display, was won by P. S. 43. The first prizes for Classes D–H were gold medals and the second prizes bronze medals. These were for individual displays, and were won by boys and girls throughout the different schools of Brooklyn. The prizes for Class K, backyard gardens, were war savings stamps. First and second prizes were presented to our boys and girls of the outdoor garden. The first prizes were silver medals and the second, bronze medals.

On the morning of October 2 there was a short meeting of the Boys' and Girls' Club, at which Gordon Hart, the new president, presided. A report was given by the new treasurer, John Schmacke. The boys and girls made the annual gift of $0.00 to the Botanic Garden. At the close of the meeting ice cream and cake were served. The "ice cream party" is an annual affair and is paid for by the members of the Boys' and Girls' Club.

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